The Builder.

VOL. XXVI.—No. 1334.

*The Hospitals of the World.**

THERE is little that need now be said to the readers of the *Builder* on the subject of hospital-building; and we might perhaps complain that the advantage derived from our labours by the author of this last book on hospitals is scarcely admitted as it should be. However, we will let that pass. The book comprises a recital of the requisites of hospitals in construction and appliances; an inquiry into the best mode of administration of such charitable institutions; a considerable amount of information relating to special hospitals, such as those devoted to convalescents, lying-in patients, incurables, lunatics, consumptive patients, children's hospitals, eye, fever, military, lock, Samaritan, orthopædic hospitals, those in tents, marquees, and huts; notices of hospices and workhouse infirmaries; a chapter on dispensaries; a report upon the plans in continental cities for the relief of patients at their homes; and brief descriptions of about 200 institutions in Europe, Asia, and America. The ground-plans of about fifty hospitals are given.

If we would realize the wide importance of perfection of hospital accommodation, we must bear in mind that 170 deaths out of every 1,000 in London take place in hospitals. It is difficult for the mind to grasp the misery of 12,000 deaths in the metropolitan institutions as the average amount. Yet 12,000 times those in authority in the various hospitals of London give quiet instructions that the cold, still form that has then ceased from suffering should be removed, and the bed whence it is taken made up afresh for another patient. In England and Wales, in 853 institutions, where there were 154,602 inmates in 1867, there were 32,437 who closed their eyes for ever in them. The greatest sanitary precautions and most complete sanitary contrivances, doubtless, could not have saved all these lives, but we may take it for granted they would have considerably augmented the crowd of convalescents that went away rejoicing. What these precautions and contrivances should be it is the aim of Dr. Oppert to show; the system of relief, however, occupying scarcely a secondary place in his work. He gives the preference to the pavilion plan. Speaking of the exterior of a hospital, these are our author's views:—

"Whatever," he says, "may be the style of architecture—Gothic, Italian, or mixed—I should not object to a fine clock-tower and an ample porch. The chimneys need not look ugly, and narrow entrance-doors can be avoided. The architect ought to dispense with arched windows. A little stained glass in the chapel is not very expensive. Simple iron railings may surround the building at some distance, and there need not be an entrance looking like a triumphal arch. The material of which the walls are built should be good bricks, and the architect may avail himself of Portland stone and terra-cotta."

He adopts the arrangements now usually approved. The offices for administration and the sleeping-rooms of officials and nurses should be separated as much as possible from the wards. He would have no hospital more than two stories high, as the vitiated air ascends. The kitchen should be a separate building, connected with the main building only by a corridor, so that no smell of cooking should pervade the house. The wash-house and the dead-house should be alike detached. The water-supply should be abundant and good. The staircase should be stone, and wide enough to admit of carrying up the patients conveniently. Linen-shoots of earthenware should be provided close to all wards. About thirty beds, or a few more or a few less, he considers the most suitable number in a ward. The basins in lavatories should be of glazed earthenware, and those that are emptied by tilting are preferable to those furnished with plugs. Waterclosets should be everywhere provided instead of latrines. Knobs that are pressed by the finger, to admit hot or cold water into the lavatories, are more desirable than taps. The bath and lavatories he places in one apartment, divided from a ward by a ventilated passage-way, and the sink, urinals, and waterclosets in a corresponding one exactly opposite to it. The bedsteads should be iron, painted a cheerful-looking colour, and on castors, except in the surgical wards. They should be of a convenient height, for though a low bedstead is preferable for a patient given to fall out of bed, it is a serious inconvenience to those attending him. Dr. Oppert mentions the case of the surgeons who attended the wounded during the July fights in Brussels, 1830, and who, owing to constantly stooping over the low beds, were hardly able to keep upright when walking. The best mattress is a spring one covered with horsehair at least 2 in. thick. There should be a head-shelf, foot-board, a rope with a hand-grasp, a chair, and a marble-topped side-table to every bed; and a low screen painted a dark green colour at hand to be used when needed. A long table with a marble top should be in the centre of the ward, and a sideboard and a few easy chairs should not be wanting. Gas, with ventilating pipes to carry off the foul air, is the best means of lighting.

With regard to warming, Dr. Oppert's sympathies appear to be with the continental stove rather than with the open chimney and fireplace. The German stove is used in the hospitals of Russia and North Germany. This is formed of clay and claytiles, and, although capable of being made ornamental, is generally found to be anything but beautiful in these buildings, where the cost is a consideration. He says, if large, they interfere with the ventilation, for the air does not circulate in the recesses in which they stand, nor in the space between them and the wall; nevertheless, they seem indispensable in climates north of the 54th degree, as there are no other means for heating the wards so gradually, thoroughly, and retentively. Iron stoves are smaller and less expensive, but the heat is not maintained for so long a time; they are useful, however, where it is an object to obtain heat quickly for a short period. In the Berlin Charité hospital the stoves are placed in the wall dividing the wards from the corridors, whereby one stove serves both apartments; but this plan our author opposes, as a waste of surface heat upon the intersecting walls. He speaks well of the remodelled fire-grate made of brick grates in an iron stove, where the air is supplied from behind the grate, and the smoke is directed into a chimney without a register. There is an air-chamber behind this grate communicating with the outer world, whence, after the air is heated, it is carried up a shaft and dispersed in a ward by means of a louvre. The expense of these, 30*l.*, is the chief objection. The French calorifères are iron stoves surrounded with brick mantels, whence the hot air in the intermediate space ascends through apertures to the ceiling. In the great Parisian hospital Lariboisière the heating and ventilation are combined. There are two systems in use, both of which work well. On the female side water is heated in a boiler, whence pipes convey it to a reservoir or tank, from which it is conducted to the several floors, and back again to the boiler. The pipes pass through four stoves on each floor.

"The ventilation is caused by the heat of the reservoir to which all the foul-air channels lead. The reservoir, containing several divisions, forms a large surface, from which heat is thrown out. The foul air ascends through the channels formed by these divisions, and ultimately escapes by a chimney. Fresh air continually replaces the impure, being admitted through channels which end in the outer walls, and communicate with the stoves. The following is the second system, the system Grouvelle-Thomas-Lawrence. There are four stoves filled with water in each ward; this water is heated by steam pipes from a boiler in the cellar, each pavilion having its own boiler. The ventilation is by forcing in or injecting the air. An air-shaft, higher than the chapel, communicates with a cellar, where a fan is placed. This fan or ventilator has four wings or blades, bent to an angle, and revolves very quickly, viz., 400 times a minute; it is set in motion by steam power. It draws the air from the shaft and forces or injects it into a channel, which takes it to the wards. The air passes through the stoves in the wards, and from their forty-eight apertures and some openings in the flooring it moves up to the ceiling with a considerable force, and replaces the foul air at the ceiling, which finds its way out through apertures near the floor."

Notwithstanding this care and expenditure, Lariboisière has nearly the highest death-rate of any of the Parisian hospitals; and, although it is urged that one-third of the patients are tuberculous, and a large proportion hopelessly sick when admitted, it is certain the expectations based on theoretical calculations have not been fulfilled. We believe that operations are less successful where artificial systems of ventilation are in use than where a sweetening of the air is relied upon from the opening of doors and windows.

Without a proper amount of cubic space per patient the best methods of ventilation would not be sufficient. Medical men are frequently pressed by architects to state the amount they consider adequate.

The author of the present book, after giving the composition of pure air, allowing for the carbonic acid exhaling from the lungs and skin, and the watery vapour lost by the body, giving the results of various experiments made by German philosophers, comes to the following conclusion:—

"Taking into consideration all the impurities caused from spittoons, bedding, poultices, infusions, bathing, &c., Poumet thinks the sick require about double the quantity of air that would be considered necessary for healthy people; this would be 30 or 40 cubic mètres per bed per hour. But 40 cubic mètres will be insufficient when patients suffer from gangrene or typhoid fever, especially when the temperature is high. A much larger supply is then desirable, the amount of which I scarcely can state in figures."

We may add that 60 cubic mètres (2,100 ft.) are considered necessary in Lariboisière. Our author sums up his tenets concerning ventilation in nine dogmas, to which we refer those employed in hospital construction or management.

We have described and illustrated before now the workhouse infirmary of the Chorlton Union. It consists of five oblong blocks or pavilions, 100 ft. apart, connected at the southern end by a long arcaded corridor, which forms the means of communication. Each pavilion is three stories high; and the ward on each floor is 124 ft. long and 24 ft. wide, and has beds for thirty-two patients. Each ward is approached from the south end by a spacious staircase, and all are alike provided with a nurse's room, 12 ft. by 11 ft.; a scullery, 12 ft. by 10 ft.; a watercloset for the nurses, and a hoist at the south end; and in two small projecting wings, at the north end, with two waterclosets for the patients, a sink for cleansing the bed-pans, a closet for brushes, &c., baths, lavatories, dust-shoot, and foul-linen shoot. The cubic space per patient is 1,350 ft. The height of the wards is 14 ft. 6 in., 14 ft., and 15 ft. There are various contrivances to admit the outer air. The long sides of the walls of the wards have a series of windows, divided into three, facing one another, 4 ft. 8 in. wide, and extending from 2 ft. 9 in. above the floor to the ceiling. We have already illustrated these windows.

* "Hospitals, Infirmaries, and Dispensaries: their Construction, Interior Arrangement, and Management, with Descriptions of existing Institutions, and Remarks on the present System of affording Medical Relief to the Sick Poor." By F. Oppert, M.D., L.R.C.P.L. London: John Churchill & Sons, New Burlington-street. 1867.

There is a louvre over the door from the staircase, and a swivel window at the opposite or balcony end of the ward, by means of which a current of fresh air can be obtained without opening either door or windows. At various points there are air-shafts running up the walls which discharge themselves above the roof level; as well as a number of small air grids built in the walls close to the ceilings. The floors are provided with hit-and-miss gratings, with galvanized iron horizontal tubes to conduct fresh air to the foot of the beds when required. The windows of the top wards do not reach the ceilings, as the upper floors are partly in the roofs. To compensate for this difference there are large revolving ventilators on the ridges. The lighting is by gas. Three suspended rings of burners, with a funnel-shaped cowl, terminating in an iron flue communicating with a shaft in the wall, are placed in each ward. The warming is effected by open fire-brick fireplaces. An iron hood partly closes the upper part of the opening, which is furnished with a hit-and-miss grating, which can be opened when the fires are burning brightly, to admit of a stratum of air being drawn off up the chimney. The drainage is kept outside the buildings, and in the three principal chimney-stacks of each pavilion a drain-ventilating flue is built unconnected with any other, but placed between two smoke-flues, so that their heat may assist in forming an upward current. Charcoal-boxes are placed on the tops of these drain-ventilating flues to destroy the gases. Dr. Oppert mentions as a defect that the inmates complain of cold, and sometimes catch cold, which fact he attributes to a draught from the top of the windows straight down to the beds.

American hospitals resemble those of England both in construction and administration. The Boston Free Hospital is on the pavilion plan, is two floors high, and affords ample cubic space. At one end of each ward are rooms for the nurse and a separation-room, and at the other the baths and waterclosets. The peculiarity of this plan is, that the six pavilions are distributed round a centre, as though they were the arms of a cross, and the connecting corridors are curved, and radiate from the centre. The Hammond Hospital, on the Chesapeake Bay, consists of sixteen pavilions placed in a circle, the centre of which is occupied by the administrative buildings. The Philadelphia temporary hospital was also on the pavilion plan. The wards, some of which contained forty-eight beds, were one story high, and built of wood. 214 temporary hospitals, containing 134,000 beds, were erected in the space of four months in the course of the late war.

Indian hospitals present very different features. The columns of the *Builder* have from time to time furnished descriptions of hospitals in various parts of the world, and some of these are reproduced in the present work. The account of the European hospital in Bombay will be thus familiar to our readers. In East India the native or military hospitals are mere sheds, furnished with mats instead of beds. The patients dress their own food according to the manner prescribed by their religion, contenting themselves with receiving medicine only at the hands of the authorities. In consequence of this arrangement, hospital cookery is lamentably neglected. With but one or two exceptions, states the author, upon the authority of Dr. Gordon, there is not at the present day a cooking range in any regimental hospital. The cooking-place is the ground, and the rice is baked in the cinders. Corresponding with this shortcoming is the fact that one matron is considered able to nurse the invalids of a battalion.

The famous pavilion hospital of Bordeaux, the first built upon the principles laid down by the Paris Academy, is outlined, as is the scarcely less celebrated institution in Brussels. Of the German hospitals he gives no attractive report. They are often of great extent and ancient origin, but the construction is nearly always defective. The corridor system is most in vogue. The Bethanien hospital, Berlin, founded in 1847, is on this plan. So is the Katholisches Krankenhaus. So, too, is the principal portion of the Charité hospital, where 1,400 patients are received. In the Summer Lazareth, a detached block, there are two floors over a cellar or basement, and several of the rooms in the basement are used to live in. There is an anatomical school in connexion with this institution, for which there is every accommodation. The new Charité, Berlin, is built in the form of a horseshoe. The Allgemaine Krankenhaus, Munich, for 500 patients, is an oblong building, having two central courts, divided from one another by a central block, in which the kitchen and some private wards for patients who pay are situated. In this building the lower wards have stoves, furnished with hollow columns of cast iron, which ascend through the three floors. These columns are covered in the upper wards with glazed tiles, leaving ornamental apertures through which the warmed air passes. Besides this arrangement, there was an elaborate system of channels for foul air leading to the stoves on the ground-floor, and air-towers with air-channels between them and the wards, and other air-channels running through the roof, which branched off with smaller ones, communicating with the space between the iron columns and the tile mantels. But this scheme proved a failure, for the foul air often remained stagnant in the channels, and sometimes came back again into the wards. The apertures have since been closed, and the stoves treated as calorifères. There is a system of ventilation in use at the Aushülfe Krankenhaus, Munich, which Dr. Oppert thus describes:—

"There are calorifères in the wards, composed of an inner stove of cast iron, a brick mantel, and a movable top made of tin; the latter has a large aperture. The outer air is admitted into the intermediate space from the floor in the usual way. There are foul-air channels leading to the roof; they end by two apertures in the walls of the wards, an upper and a lower one, and either may be closed by a valve. There is an anemometer placed in each channel, and a permanent indicator shows how the air moves inside, if rapidly or slowly. This is a novel and an economical system, but I doubt if it will be quite satisfactory, because the draft will not be strong enough in the eduction channels. In summer time this is to be improved by a gas-burner, which is lighted in the shaft near the roof."

The Vienna General Hospital is built round nine square courts, most of which are laid out as gardens, with fountains in them; three thousand patients can be accommodated here in ninety-three wards; and there are four amphitheatres, two dispensaries, three laboratories, two large kitchens, washhouse, several ice-pits, besides the officers' apartments and offices. The floors of the wards are of red brick. There is no artificial ventilation and no waterclosets. Unless a recent change has been made, says the author, there are night-stools in the corners of wards, standing behind curtains! No small-pox patients are received. Every patient either pays for himself or is paid for by the municipality or parish. First-class patients pay 4s. 4d.; second, 2s.; third, 10d. per day. Out of every hundred patients who find shelter here, thirteen or fourteen do not recover, despite the gardens and fountains. In the Hospital Rudolph-Stiftung, built by the Emperor of Austria, in commemoration of the birth of his eldest son, a combination of the pavilion and corridor system has been tried. Its construction occupied more than four years. In the centre is a court 180 ft. by 330 ft. laid out as a garden. Around this run two-storied lines of building over ground floors, except on the east side, where the hall is only one story high. From this quadrangle project three pavilions, containing sick-wards, a fourth set apart for the administration and dispensary, and two others fitted up with baths and waterclosets. The pavilions project 84 ft., and are 126 ft. apart from one another. The cubic space per patient is 1,480 ft. The windows are double and 10 ft. high, two-thirds of this height opening like doors, and the top third is movable, and can be made to incline inwards by a screw and toothed wheel, which fixes both the outer and inner portion at the same time. Dr. Böhm's calorifères are used for heating, and gas, with ventilated globes, is employed for lighting. The Italian hospitals, which are nearly all of Mediæval origin, and attended by monks and nuns as nurses, have frequently been convents in the first instance, and are therefore but defective buildings as hospitals. The classification of the patients is very imperfect. The Ospedale di Sta. Maria Nuova, Florence, was founded in 1289, and by the addition of wing after wing is still available. There are about fifty wards in it, and 1,200 patients. At Geneva is another large ancient ospedale, constructed round courts. At Mantua the Austrians have built a hospital, which the author calls notorious for its unhealthiness. The grand hospital at Milan was formerly considered a model. We examined it personally a few years ago, and could not endorse that opinion.

It was opened in the year 1456, and can contain nearly 3,400 patients, but the usual number is under 2,500. It is situated close to a thoroughfare, and a canal runs at its back, the water of which moves a flour-mill, used to grind corn for the inmates. The buildings are one story high, except in the centre, where we find two floors. The buildings stand around square yards, the principal one being much larger than the others. The principal wards form a cross, in the centre of which is a cupola, with an altar beneath it, where divine service is performed daily, in sight of the patients. These wards have corridors on both sides, which are not so lofty as the ceilings of the wards, and consequently there is plenty of room for windows above these passages. The height of these wards is between 30 ft. and 40 ft. at the highest point; the ceilings are vaulted, the floors covered with red bricks or flags, this being preferred for coolness. The outside wards are nothing but spacious corridors. The latrines are at one end, and the less said about them the better. There is no warming apparatus, but small portable stoves for charcoal: they are rarely used, the climate being so mild. The windows are used for ventilation. The cubic space for each patient is more than 2,000 ft.

We have to add to this picture of an Italian hospital, in which Mediæval devotional intensity pervades everything from the construction to the attendance, that there are six establishments in connexion with this, devoted to special forms of human infirmity, five of which were once convents. Naples has a hospital, called Della Pace, that was originally a palace. It has one ward 300 ft. long and 130 ft. wide, with handsome columns supporting the arched ceiling. The Ospedale San Luigi di Gonzaga, in Turin, built for the dwelling of a nobleman, is in the form of a St. Andrew's cross. There is a chapel in the centre; from this depart four arms, or blocks, two stories high, each of which contains a long ward, with a corridor on each side of it. There are openings in the wall over each bed, through which food and medicines can be passed without entering the ward. Another opening serves for a sink. The latrines have marble seats, and are supplied with water. Six large fires in the cellars are supposed to ventilate the wards at night. All the additional accommodation for the physicians, dispensary, offices, dead-house, &c., are placed in blocks to the right and left of the St. Andrew's cross thus occupied by the wards. This is an interesting example.

The Russian hospitals are palatial in their appearance. They are three and four stories high, and placed in large gardens. The wards are heated, for the most part, by Russian stoves, which make the air very dry, though the clay stoves used in North Germany are sometimes seen; and some wards have open fireplaces in addition. The bad corridor plan is most general. A large lying-in hospital is on the point of being closed on account of its defects; and as lunatic asylums are in course of re-organization all over the country, we may infer that a future survey of Russian hospitals will be more profitable than any now undertaken would be.

A few particulars of a Swiss hospital must close our notice of Dr. Oppert's book. The Zurich hospital shows the pavilion system in a modified form. The front, consisting of a centre three stories high, and two wings two stories high, is 589 ft. long. The central pavilion contains all the accommodation for the service, administration, and instruction; the females are on one side of this, and the males on the other. There are five wards on each floor in each wing, and between each ward there is a nurse's room; on each floor all these wards and rooms open into one long corridor. The cubic space is ample. The bedsteads are of wood, and placed along the walls, instead of the usual material and disposition. Something like the aroma of Swiss forests and a vision of Swiss lakes and mountains come to us when we read that the windows open on little balconies. There are tile-stoves for warming in the central building, and hot-water pipes in the wings. The last are placed in coils near the walls, and, surrounded by perforated plates, have much the appearance of stoves. The doors, which open into the corridor, have casements instead of panels in their lower parts, for the purpose of admitting fresh air when desired, without opening the whole door.

The strong point of Dr. Oppert's book is that a large number of plans are therein brought together; the weak one is, that the bad and good are not sufficiently discriminated.

Memorial Portrait.—The working men of Durham have subscribed for a portrait of the Very Rev. Geo. Waddington, D.D., Dean of Durham, to be placed in the Durham County Hospital, to which the dean has been a great benefactor. The portrait was painted by Mr. Clement Burlison, a Durham artist, and it has been placed in the principal convalescent ward of the hospital. The presentation ceremonial has just taken place.

SAVANS IN NORWICH.

The proceedings of the British Association for the Advancement of Science have been so fully reported, far and wide, that our readers will probably thank us for confining ourselves to brief notices of some few of the papers on subjects oftenest treated of in our journal. The address of Dr. Hooker, the president, was full of brave and thoughtful statements, which have, of course, provoked criticism, and will continue to do so. As an example of the views held by the advanced thinkers of the Congress, we give the peroration of Professor Tyndall's inaugural address as president of the Mathematical and Physical Sciences Section.

Materialism.

"In affirming that the growth of the body is mechanical, and that thought, as exercised by us, has its correlative in the physics of the brain, I think the position of the 'materialist' is stated as far as that position is a tenable one. I think the materialist will be able, finally, to maintain this position against all attacks; but I do not think, as the human mind is at present constituted, that he can pass beyond it. I do not think he is entitled to say that his molecular groupings and his molecular motions explain everything. In reality, they explain nothing. The utmost he can affirm is the association of two classes of phenomena, of whose real bond of union he is in absolute ignorance. The problem of the connexion of body and soul is as insoluble in its modern form as it was in the pre-scientific ages. Phosphorus is known to enter into the composition of the human brain, and a courageous writer has exclaimed, in his trenchant German, '*Ohne Phosphor kein Gedanke.*' That may or may not be the case; but even if we knew it to be the case, the knowledge would not lighten our darkness. On both sides of the zone here assigned to the materialist he is equally helpless. If you ask him whence is this 'matter' of which we have been discoursing, who or what divided it into molecules, who or what impressed upon them this necessity of running into organic forms, he has no answer. Science also is mute in reply to these questions. But if the materialist is confounded and science rendered dumb, who else is entitled to answer? To whom has the secret been revealed? Let us lower our heads and acknowledge our ignorance one and all. Perhaps the mystery may resolve itself into knowledge at some future day. The process of things upon this earth has been one of amelioration. It is a long way from the Iguanodon and his contemporaries to the president and members of the British Association; and whether we regard the improvement from the scientific or from the theological point of view, as the result of progressive development or as the result of successive exhibitions of creative energy, neither view entitles us to assume that man's present faculties end the series—that the process of amelioration stops at him. A time may, therefore, come when this ultra-scientific region by which we are now enfolded may offer itself to terrestrial, if not to human investigation. Two-thirds of the rays emitted by the sun fail to arouse in the eye the sense of vision. The rays exist, but the visual organ requisite for their translation into light does not exist. And so from this region of darkness and mystery which surrounds us rays may now be darting which require but the development of the proper intellectual organs to translate them into knowledge as far surpassing ours as ours does that of the wallowing reptiles which once held possession of the planet. Meanwhile the mystery is not without its uses. It certainly may be made a power in the human soul; but it is a power which has feeling, not knowledge, for its base. It may be, and will be, and we hope is turned to account, both in steadying and strengthening the intellect, and in rescuing man from that littleness to which, in the struggle for existence, or for precedence in the world, he is continually prone."

The Rev. Canon Girdlestone read a paper on,—

The Condition of the Agricultural Labourer, especially in the West of England.

The Rev. Canon observed that the progress of manufacture, so far from lessening, had rather increased the value of land. Fortunes made in manufactures were generally invested in land, and Great Britain retained, and was likely always to retain, its character as an agricultural country. Landowners occupied the highest positions and enjoyed the greatest social privileges. Public opinion, the reform of universities and public schools, the facility for foreign travel, and the admixture of the manufacturing classes with the old landed proprietors, had much raised the character and improved the tone of the latter. Still, especially in the West of England, there were many of the old school remaining who resisted all progress. The race of farmers was much improved, but not so much in the West of England as elsewhere. The land was also much improved; a larger area was brought into cultivation, and each acre was made to yield more. In this respect also, in the West of England, there was less improvement than elsewhere. Nowhere had the improvement of the agricultural labourer kept pace with that of the landowner, the farmer, and the land itself. In the West of England the condition of the labourer was very little different, and, in some respects, it was worse than it used to be. Wages were low, while fuel and provisions were dear, and the poor-rate was so administered as to quench every feeling of independence. In the West of England an agricultural labourer had till lately only 7s. or 8s. a week, and now only 8s. or 9s. Unless he was a horsekeeper or a shepherd, he had to pay out of this 1s. to 1s. 6d. a week for house-rent, and provide food, clothing, medical attendance, fuel, and every other necessary for himself, wife, and family. He paid a high rent for potato ground, and fuel he seldom got, except at the cost of many hours of hard work. He had three pints or two quarts of cider a day, and he had a portion of his wages often paid in grist, which when grist was dear was an advantage, but otherwise a loss to him. He was often not allowed to keep a pig or poultry, lest he should steal food for them from his master. He worked nominally ten or ten hours and a half a day, with an hour and a half deducted for meals. He was almost always, however, kept a much longer time than this, and was seldom paid anything for overtime, except by bread and cheese in harvest time. Women got 7d. or 8d. per day for out-door work, with a quart of cider, and boys small sums in proportion. The men breakfasted before they left home on "tea-kettle broth," which consisted of bread and water with a little milk if (which was not often the case) it could be got. For luncheon and dinner, which they took with them, they had coarse bread and a little hard, dry, skim-milk cheese, at 3d. per lb. For supper, on their return home, they had potatoes or cabbage, with a very small slice of bacon sometimes to give a flavour. Butchers' meat they seldom saw, except it was given to them. They were unable to lay by anything, and few comparatively belonged to benefit societies. They were long-lived, but even in their prime feeble, and at the age of 50 they were often crippled with rheumatism, the result of poor living, sour cider, a damp climate, hard work, and anxiety combined. There remained nothing for them but parish pay and the union. There were many exceptions to this general rule, often even in contiguous parishes, owing to the presence of an intelligent resident landowner, or the immediate neighbourhood of a large town, mines, or manufactures. The wages of the agricultural labourer were always higher in the neighbourhood of towns, mines, and manufactures. The condition of the agricultural labourer varied, indeed, greatly in different parts of England; but the fact that in agricultural districts the poor-rate was very high, that there were more marks than signatures in the marriage registers, that recruits from the same districts were seldom able to read or write, that our prisons were filled from the same districts, and the general conviction that agricultural labourers were wholly unfit to be trusted with the franchise, were real and reliable evidences of the low condition of this class of men. That which was really required for the agricultural labourer was, in one word, "independence." At present he was the most dependent of any class of labourers. In order to change this—firstly, good wages were required in proportion to quantity and quality of work, but always, in the case of an able-bodied and industrious man, enough to keep him and his family, with a margin for insurance against old age or sickness; secondly, well drained and ventilated houses, with at least three bedrooms and all other appliances for decency, with a provision also against taking in lodgers, such houses to be in the control of the landowner rather than the farmer; thirdly, greater facilities for education should be afforded; fourthly, all "mops" and hiring-fairs should be abolished, and a good system of registration should be generally adopted and made known through the instrumentality of the penny papers throughout the country; fifthly, agricultural labourers' unions of a strictly protective character, and well guarded against intimidation, to either employers or fellow-workmen, might be formed with advantage—the whole system of unions was not to be condemned because of outrages committed by a few; sixthly, there should be legislation in favour of the agricultural labourers, especially as regards education, and the administration of the Poor Law by a central board of disinterested officers, instead of by a local board of landowners and farmers. Legislation so far had done less for the agricultural labourers than for any other class, although landowners and farmers had a special pecuniary interest in the improvement of the rural workman. The outspoken language of this paper provoked frequently excited interruptions of dissent.

Mr. F. S. Corrance, M.P., read a paper on

The Social Condition of the Wage Class.

He traced at considerable length the rise of a great wage-paid class, and the industrial transformation of the North of England, and then proceeded to inquire whether the Poor-law legislation for thirty years had been successful. The last thirty years had been a time of peace, of free trade, of unequalled increase of wealth, of unparalleled emigration; but the expenditure in poor relief had increased in 1867 to 6,959,840*l.*, as compared with 6,317,255*l.* in 1834, the population of England and Wales being 21,100,000 in 1867, as compared with 14,322,000 in 1834. Was, then, pauperism extirpated? Had the rates decreased? Were the Poor-laws abolished? He feared that these questions could not be answered in the affirmative. On the contrary, the system had taken firm hold of men's minds, and as a vested interest it claimed its place. It was an important source of patronage and place, and the management charges were daily on the increase, having been 596,162*l.* in 1853, 696,098*l.* in 1863, and 730,704*l.* in 1867, showing an increase in fourteen years of 134,542*l.* Morally speaking, what men had the present system reclaimed? Whom had it made more provident? What encouragement or assistance did it hold out? It acted by repression, it pauperized, it exacted a hard and rigid test. Poor-laws might satisfy a present requirement, but they could not cure pauperism. Taught self-dependence, and with self-interest prescribed as the great rule of life, the working classes set to work according to their light, and applied the doctrine to some remarkable effects. The number of friendly societies had now reached 24,800, with 3,000,000 members, and 20,000,000*l.* of assets in hand. At the close of 1866 the number of depositors in savings banks amounted to 2,149,764, and the deposits to 44,495,806*l.* All these facts seemed to him clearly to indicate the necessity of authority to guide and direct the efforts made, and to protect the weak. All that was ever urged against friendly societies tended to such a point; they were sometimes the speculations of clever knaves, or were conducted for the benefit of a public-house. He considered that medical clubs were a great advance upon the medical assistance afforded by the Poor-law Board. The objects embraced under the co-operative associations were multiple, but they might be divided into at least three classes,—societies for the transfer of goods or merchandise, societies of credit, and societies of production, building societies coming under the latter head. Even in agriculture co-operation had been tried with a fair amount of success. That such a system could or would ever supplant scientific agriculture, aided by machinery, need not be dreamt of. As regards trades unions, considered purely as such, if under a new sense of power and liberty ignorant or half-informed men had acted upon a doctrine which learned men had sanctioned—that of self-interest—it was not to them alone that blame was to be attached. These men were bad economists; they were reckless except of present gain. Their morality was not the morality of the upper classes; but these things did not grow up in a night—they followed as darkness followed light. They would pass away, but the dawn might not be yet. Upon the whole the Poor Law had failed, and an increasing pauperism and a vicious code of social laws were no safe or pleasant features. Was there no gentler code which we could suggest more in accordance with social economy and the Christianity we professed?

Very great interest was excited by these two papers, and the discussions were long and valuable. We may, perhaps, return to them.

The Pecuniary Results of Prison Labour.

On this subject Sir J. Bowring read a paper. He said the objections to making prison labour profitable might be mainly grouped together under four heads: first, that prison discipline should be simply deterrent; secondly, that to teach a convict a trade was to place him in a better position than the honest man outside the prison; thirdly, that prison labour would be put unfairly in competition with honest labour; fourthly, that in agricultural counties the teaching prisoners other trades would lead to a scarcity of agricultural labour and to a rise in wages, to the detriment of the agricultural interest. As regards drunkenness, which was the main source of crime, Sir John characterised it as the great Christian vice, or one which professedly Christian nations exhibited in its most offensive and dangerous form. As regards the argument that prison discipline should be deterrent, the policy of appealing to the hopes as well as to the fears of convicts might be advantageously adopted. Again, in few instances could convict labour be so productive as prison labour, since all social influences and stimuli were wanting while the improved appliances so usefully introduced in manufactories were also not within the reach of the convict. If convicts, too, had been at work in the open market, would they not have brought their competition to bear upon the price of labour and products? After all, convicts were "in-door servants"—who were bound to give their services to those who provided for them. As to the objection that teaching convicts a trade would injuriously affect the agricultural labour market, was the apparent desire to obtain gaol birds among the rural peasantry creditable? Was not the elimination of convicts from any occupation or interest an advantage? The economical aspects of the question were, however, of less importance than its moral aspects. A gaol might be made a reformatory school, and by beneficent influences faculties might be developed, the existence of which might not be at all suspected. The prisoner ought, indeed, to be made the confederate and not the foe of society, a supporter of the law and not the breaker of it; and prison labour was, he contended, a great influence which might be enlisted to conduce to this result. Sir J. Bowring proceeded to cite statistics to show the excellent results which had followed the introduction of prison labour at Wakefield, Taunton, and elsewhere. The Indian prisons were made more than self-supporting by prison labour, while the re-committals were small. The experience acquired in American prisons was to the same effect. In Massachusetts some of the products of the prisoners carried off prizes at the Paris Exhibition, and purchases were made by the King of Prussia and the Emperor of the French. At Wakefield the earnings of the prisoners in 1867 were 7,384*l.*; and the whole of the trade capital which belonged to the Government, amounting to 10,000*l.*, had been repaid. The average earnings of each prisoner were, in 1864, 4*l.* 12*s.* 6*d.*; in 1867 they were 7*l.* 4*s.* 7*d.* In the Salford prison the net earnings were 3,369*l.*, being an average of 5*l.* 18*s.* 10*d.* per prisoner. At Bradford, in the five years ending 1857, the profits derived from the results of industrial labour introduced in the county prison by the present governor, since his appointment in April, 1853 (and which had been conducted without any aid from the county-rates) were 985*l.*; in the five years ending 1862, 1,357*l.*; and in the five years ending 1867, 2,506*l.* Including work done in and about the prison, for which no charge was made to the county and other receipts, the total profits on prison labour for the past fifteen years were estimated at 9,618*l.* As regards the Massachusetts prison, the net profits to the state of prison labour in 1867 were 22,345 dollars, while for 1868 it was estimated that the total profit would rise to 25,000 dollars. The re-committals of prisoners in Massachusetts were also relatively moderate.

Mr. J. Wyatt, of Bedford, Sir Willoughby Jones, Mr. Bracebridge, and other gentlemen took part in a short discussion which followed, the general tendency of the opinions expressed being in concurrence with the paper of Sir John Bowring. Sir Willoughby Jones, however, remarked that, as our prisons were at present constructed, the system of reproductive convict labour could only be applied to a limited number of prisoners. In the Norfolk county prison the treadmill was now reserved for strong able-bodied convicts, while the weaker were kept to remunerative occupation.

Science and Abyssinia.

In the course of a paper on the geography of the Abyssinian expedition, Mr. G. R. Markham, the Government geographer of the expedition, said the remarkable passes from the coast to the highlands of Abyssinia have been thoroughly explored, the mountain chains forming the watershed of a vast region have been examined, and the numerous sources of the great fertilising tributaries of the Nile have been accurately surveyed. Besides the observations I have taken, that most zealous and indefatigable of quarter-master-generals, Colonel Phayre, has completed a rough but useful survey of the whole country traversed. Dr. Cooke, notwithstanding severe illness, has done much valuable meteorological work; and the officers of the Indian trigonometrical survey have completed the mapping of the eastern portion of the Abyssinian highlands. But, important as the geographical results of the expedition have been, our science is not the only one that will be enriched by it. Mr. Blandford, who, from his intimate knowledge of the analogous formations in the Deccan, was peculiarly well qualified for the work, has found the geology of this part of Abyssinia to be exceedingly interesting—so interesting that he resolved to be amongst the last to quit Abyssinian soil. He has also added to our knowledge of the zoology of the country, and ascertained the existence of four distinct zones into which the fauna is divided. Mr. Jesse, who was sent out by the Zoological Society, and several officers, have also made large collections of skins, both of birds and mammals. The botany had been already thoroughly worked out by M. Schimper, the Nestor of King Theodore's captives. The country on the line of march also presents many points of antiquarian interest. The ruins of the Greek emporium at Adulis, on the coast, and of Koheito, at the head of the Deganta pass, offer a field of research of no common interest to the archæologist as throwing light on the ancient intercourse between the Axumite kingdom and the Egypt of the Ptolemies. The cave church at Dongola, the curious ruin at Azula, and the famous caverns of Lalibela, illustrate the late period when one of the most ancient Christian churches was established in Abyssinia. Nor can it be said that nothing of antiquarian value was to be obtained worth taking away, when several thousand MS. parchment folios were found in the library of King Theodoros, and a golden chalice, belonging to Sultan Segved, a king who flourished in the sixteenth century, were amongst the plunder of Magdala. The main objects of the Abyssinian expedition have been gained. The men of science who accompanied the expedition have not returned empty-handed, and there are few regions on the globe where so much could be found to repay inquiry.

The Broads of East Norfolk

was the title of a paper by Mr. R. B. Grantham, C.E., and had reference to water-supply, storage, and drainage. These broads, or lakes, he said, were not commonly found in the same geological formations in England. As an instance of utilizing the waters of these broads, and also of improving lands affected by them, he referred to the Great Yarmouth Waterworks Company, taking water from Ormesby, Rollesby, and Filby Broads (possessing together an area of from 400 to 500 acres), and supplying the town of Yarmouth and its neighbourhood; and the cases of improvement of land by drainage as carried out at Martham, Somerton, and Winterton, and Beccles, and other places about to be constituted drainage districts. To show the origin of the broads, he described the geology of those portions of the country in which they are situated, and from this and certain historical facts he deduced the conclusion that the eastern valleys of Norfolk were formerly branches of a wide estuary, and that the present rivers and broads are the remains of that large body of water. He then proceeded to refer to the valleys of the rivers Bure, Yare, and Waveney, and their tributaries, the combined water-sheds of which extend over parts of Norfolk and Suffolk, and embrace an area of 1,210 square miles, or 774,400 acres. The Bure and the Yare together drain more than half Norfolk, the Waveney only a small portion, but a large part of Suffolk. In Ormesby Broad, on the north side of the Bure, the surface of the water is 2 ft. or 3 ft. above the high water of the Bure at the sluices at the end of Muckfleet. It is said to be 20 ft. deep in some places, which would make its bottom considerably lower than low water in the sea. Probably the bottoms of many other broads may be below the level of the sea, which may be accounted for by depressions and upheavings of the formation. River-beds are not unfrequently lower than the low water of the sea, and this occurs far up their courses away from the sea. In some cases this may be traced to the force of the currents deepening them, but in the broads there are no currents or other disturbances to cause an excavation of the bottom. The Broads are supplied by streams running into them from minor valleys and springs which rise in the formations, to which they form catchment basins or reservoirs, and are no doubt performing a most important and useful part in the economy of water supply by detaining superabundant quantities of water from storms and continuous wet weather; and they prevent inundations in the lower parts of the country by affording time, where the inclination in the main valley is slight and the velocity naturally slow, for floods to pass off at each successive low tide. With regard to the scour of the river Yare, Mr. Grantham was of opinion that it would be most desirable to deepen the whole of Breydon Water and impound a larger body of back water, and thereby further increase the scour at the bar. Passing to the subject of drainage in connexion with the broads, Mr. Grantham did not recommend their conversion into agricultural land, considering the great importance of keeping them as reservoirs, particularly those of large areas, in which the water would continue good and wholesome. The land to be acquired by draining the broads, if that were possible, would amount to 2,500 acres, which is a trifling quantity as compared with that which may be retained round about them, or with the quantities which might be improved in many other parts of the county. The drainage he would recommend was that of the marshes and swamps, which were mostly caused by the broads and the rivers in connexion with them. Most of the lands he had seen in this state would be highly productive and profitable if they could be deprived of the surplus water and so maintained. At the same time he would secure the means of using the water for irrigation, if necessary. This conversion of the marshes into profitable and remunerative land need not interfere with the impounding and storing the water in the broads. By the improvement of so much land a large amount of additional permanent employment would be given to the population, and the healthiness of the localities would be increased. Although large bodies of water might be objected to, he did not consider them so injurious as the miasma arising from the evaporation and exhalation from the decaying of the vegetation of large tracts of marshes, which is the chief cause of fever and ague in the tropics and other similarly circumstanced countries and districts.

We must end, for the present, with a brief notice of what Mr. Jas. Fergusson said

On Buddhist Architecture.

The discourse was delivered at an evening meeting in the Drill-hall, and was listened to with great attention, which is more than can be said of the audiences on some other occasions. His subject being an Indian one, was consequently a subject upon which much ignorance existed in England, and he was enabled to give a great amount of information which had the charm of novelty. He first referred to the foundation of the Buddhist faith by a native prince named Sakya Mune, or Buddha, several centuries before the Christian era. This prince abandoned all his worldly comforts and possessions, chose an ascetic life, and for fifty years lived under trees and taught the doctrines he wished to disseminate, viz., kindness to animals and to all living things, and, above all, brotherly love and kindness to all men. But it was not till 300 years after his death that Asoka made it the State religion, and was said to have converted all India to the faith; and it was still 600 years later that Nagarjuna established ministers and gave Buddhism a clergy, and from that time it spread over Burmah, Siam, into China, all over Thibet, and the greater part of Asia. A very remarkable fact, however, was that, although Buddhism was still the religion prevailing over a great part of Asia, there was not now to be found a single Buddhist in India, the land of its birth. Having given an elaborate description of the monuments of Sanchi and Amravati as examples of the structures raised in honour of Buddhist saints, the lecturer went on to refer to the details of the architecture of several periods, the sculpture proving beyond all doubt that tree and

serpent worship, which was the religion of India previous to the introduction of Buddhism, had again gradually crept into the new faith. Tree and serpent worship, he observed, had at some period or other prevailed all over the world, and doubtless the frequent reference to trees and serpents contained in the Holy Scriptures was in some way connected with this practice. Trees and serpents also held a high place in all the mythological fables; and his opinion was, that if this subject were thoroughly looked into they would arrive at an amount of ethnological and religious knowledge now quite unsuspected. All over the steppes of Asia, throughout Scandinavia, and in this country, wherever they found these rude tumuli, they found traces of the same race that erected similar monuments in India; and though he did not say that people came over from India and taught the people of this country to erect Stonehenge, nor that they had any connexion with the people of India, yet there was this great underlying stratum of population, who cropped up in Europe and other parts of the world as well as in Asia, and wherever they came to the surface their monuments were similar in character, and all more or less applied to the same purpose. Originally funereal, they gradually became temples and relic shrines; but they were all monuments of one great people, and all expressed more or less distinctly one idea. He was convinced that when this subject was fully investigated they would have a very interesting picture of a people who were now only known by their rude monuments all over the globe.

SUMMER DIARRHŒA IN LARGE TOWNS.

We are rather too much in the habit of regarding as inevitable and unavoidable certain violent fluctuations in our national death-rate, looking upon them as the natural result of the season, and the alternations of temperature in our uncertain climate. It is beyond denial that in winter the duration of life of the nation, but more especially of that portion living in large towns, rises and falls in almost unvarying sympathy with the mercury in our thermometers; but we have yet to learn how much the loss of life through the various diseases of the lungs, which ensues directly the temperature falls to the freezing point, may be lessened when the social and sanitary condition of our town populations shall have been raised to a very different standard from that which is now in force. So with the summer season, it is only necessary to point to the present season as a striking example of what may be observed in a series of years, that continued high temperatures and a rainfall far below the average have always produced an excessive mortality in the shape of an epidemic of summer diarrhœa. In cold wet summers there is little or no mortality from this cause. The year 1860 is perhaps the strongest example of such a season, and in that year the deaths from diarrhœa in England and Wales were less by something like 10,000 than the average number.

Summer diarrhœa seldom becomes epidemic in England until the middle or end of July; but this year it appeared in the middle of June, produced without doubt by the excessive and unusual temperature. In London the deaths from diarrhœa rose from 31 in the second week of June, to 66 and 171 in the last two weeks, and had increased to 442 in the last week of July; since which the numbers have declined to 384, 294, and 245, in the three weeks ending Saturday, 15th instant. These numbers are exclusive of a weekly average of 30 deaths in the eight weeks ending 15th instant, which have been referred to cholera and choleraic diarrhœa, many of which are doubtless only severe cases of diarrhœa.

The Registrar General's weekly return has recently published the mortality from diarrhœa in several other large English towns besides London, and it will be interesting to compare the relative fatality of this summer scourge of large towns, in the metropolis and in the provincial towns. For the purpose of comparison we will use the returns for the four weeks ending the 15th instant. The ten towns below are those for which weekly returns of mortality are published, and they are arranged in the order of their annual death-rate per 1,000 from diarrhœa, in the four weeks above mentioned.

	Annual rate per 1,000 in four weeks.
Newcastle-upon-Tyne	4·4
Bristol	5·4
London	5·7
Bradford	8·4
Liverpool	10·8
Manchester and Salford	11·1
Sheffield	11·1
Hull	11·7
Leeds	13·2
Birmingham	16·7

From the above table it will appear that although the prevalence of diarrhœa in London in the past four weeks has raised the deaths by about 300 per week, the mortality from this complaint in proportion to population has been much more excessive in all the large provincial towns, except in Newcastle and Bristol. Although to some extent the fatality of an epidemic may be taken as a test of the general sanitary condition of any community, the above figures, if well considered, will show that some exceptional causes must be found to account for three towns like Hull, Leeds, and Birmingham, whose death-rates have recently been so satisfactory, suffering so severely from this summer diarrhœa.

The experience of cholera epidemics has taught us the first importance of an abundant and pure water supply, and the severe penalties which the absence of this necessary has entailed on different town populations; it is, therefore, natural to consider that the excessive fatality of diarrhœa in a town so generally healthy as Birmingham, at least throws some suspicion upon the quantity and quality of the water supply of that town. This high mortality, moreover, recals to mind the fact that Birmingham is still without a medical officer of health, who in such a time as the present is especially necessary to organise an effective distribution of preventive medicine, and to secure as far as possible the instruction of the poorer classes in the necessity for prompt attention in the earlier stages of the complaint. Another important duty of a medical officer is to use every possible precaution against the sale of fruit and other perishable articles of food in a condition unfit and poisonous for consumption.

The low death-rate from diarrhœa in Newcastle is in a great measure due to the greatly improved sanitary condition of the town, but has been doubtless considerably influenced by the more moderate temperature which has prevailed in this northerly town. In Bristol and London the sanitary arrangements, although still admitting of improvement, are in a more satisfactory condition than in most other towns, and to this may be attributed the smaller proportional fatality of diarrhœa. The fatal prevalence of all kinds of zymotic disease in both Manchester and Sheffield discloses a sanitary condition which explains the high death-rate from diarrhœa. It is to be hoped that greater sanitary activity, favoured by the recent lower temperature and heavy rains, will so far reduce the fatality of the epidemic, that the death-rate of 1868 will still remain one of the lowest on record.

The present mortality, however, should stimulate the efforts of all sanitary reformers to devise such precautions as will offer a greater security to our infant-town populations, from this annual scourge of diarrhœa.

THE CIRENCESTER ARCHÆOLOGICAL CONGRESS.

On the 12th inst., when the Fairford windows were visited, as already related,* the day's excursions included visits to the churches of Ampney Crucis, Maysey Hampton, and Bibury, Mr. E. Roberts, F.S.A., the hon. sec., undertaking their exposition.

At Ampney Crucis,

the vicar, the Rev. Mr. Brewster, gave an account of the accidental discovery of the head of the cross, and Mr. Planché stated that the figure in armour was of the date of Henry VI., about 1430-40. Mr. Black considered that the base was originally an engineering landmark of the Romans. Mr. Roberts, in the course of his remarks, said that the interest in Ampney Crucis had hitherto centred in its cross, but that its story, like the history of Gloucestershire, still remained to be told. Since Rudder wrote, now nearly a century since, vast strides have been made in the system of researches, and enormous amounts of materials have been gained. There is no archæological society in the county, and probably in consequence much has been lost sight of or failed to be recorded; but the more generally diffused love of antiquities has led to inquiries, and it is desirable that the history of this and other places, scarcely touched on by Rudder and Atkins, should be more fully written. As regards Ampney Crucis, the materials are few.

At the time of Domesday survey the manor of Ampney Crucis was held by the abbey of Tewkesbury, which continued in possession until the dissolution.

Downameney and Quennington appear to have been places visited annually by Edward I.; and each year, except those occupied by his French and Welsh wars, viz., about five years, he remained from three to twenty-nine days. Edward II. also lodged at Downameney in 1326, preferring either Gloucester or Cirencester when on his journeys hither.

As regards the cross and church, the work on "The Crosses of Gloucester," by Pooley, has views of it as well as descriptions. The date of the cross appears to be about 1430, and it is particularly interesting from having its upper part nearly perfect. The church has some remains of the Norman period. The chancel arch of that date is well preserved, and the doorway to the rood-loft remains.

Bibury.

The manor of Becheberie, or Bibury, is one of those the history of which commences with "Domesday Book." Mr. Roberts mentioned some curious benefactions recorded.

1. Hugh Westwood gave by will in 1559 for four of the most impotent and poor men of Bibury for maintenance, clothing, and firing, and who are lodged in his almshouse, a rent charge producing 18*l.*

2. John Smither gave by will, in 1621, 10*l.* vested in the churchwardens, being borrowed for the use of the church thirty years before, for four widows in Bibury *if possible.*

3. Thomas Tawney gave by will, in 1676, 50*l.* (lent to the church in 1754) for the use of the poor.

It appears, therefore, that sums of money were borrowed from parishioners for the use of the church, and remained a rent charge upon the parish.

The church consists of a nave 75 ft. 5 in. by 22 ft. 6 in., being slightly narrower at the west end; a south aisle, about half the length of the nave, and 13 ft. 6 in. wide; and a north aisle the whole length; a chancel 44 ft. by 15 ft., a west tower, and a south porch.

"This church may be appropriately described as an unknown treasure. It has been said repeatedly to have a very curious history if only it could be made out. In the absence of perfect records, we are driven to read its history in its walls. Undoubtedly, then, the foundation was Saxon, and many parts remain to show its size and construction. The nave is large, and the construction shows that the Saxon church was limited to nave and chancel. The latter, however, was not of the same shape or size that it now is, having been shorter, and terminated in an apse. The chancel opening bears every appearance of being the original size. The nave has been lengthened westward from the five arcades inserted in the Saxon walls, on the north side, of Transition or late Norman date; while the arcades on the south side are of a later date.

At the west end on the south side are three lancet windows, one being at a lower level than the others, with a circular or eyelet-hole window over it, splayed inside and out, precisely similar to those discovered at Framingham Earl, in Norfolk, and others which I have before pointed out in that district. I understand that Mr. Scott, who restored this church, considered this window to be Saxon. Now, although there is much of Saxon in this structure, I believe this window to be of the earliest Norman period. It is in a very peculiar position, and appears to me to have lighted a former loft. In the north aisle I must call your attention to the small piers or buttresses which are peculiar to Saxon work though in this instance it varies from the ordinary type, and seems to have been seriously restored. I have made inquiries of Mr. Scott, but I cannot ascertain what was done there. The chancel, as I have said, was lengthened, but still at an early date, the eastern aumbries being always an evidence of early times. There are as many as eight aumbries altogether, and two piscinæ, both with shelves. Five of the aumbries have been closed by doors.

Externally there are two carvings, one of Late Saxon scrollwork, and the other of Early Norman; one built into the wall of the chancel

* See pp. 598, 615, and 618, *ante.*

and, as our member, Mr. Irvine, thinks, marking the end of the Saxon work; the other is at the south doorway."

Richard of Cirencester.

At the evening meeting, Mr. Levien, M.A., read a paper on "Literary Forgeries," with remarks on Richard of Cirencester, and his writings. After some introductory observations, he referred to numerous notable literary forgeries, commencing with those of Ireland in the beginning of the present century, and including the Byron and Shelley forgeries. He then came to the work alleged to have been written by Richard of Cirencester, but which was a forgery. Richard of Cirencester was a monk of the Benedictine order, who lived between the middle and the end of the fourteenth century, dying at Westminster between 1400 and 1402. The work "De situ Britanniæ," put forth as emanating from the polished brain of Richard of Cirencester, was proved to have been written by Charles Julius Bertram, a Copenhagen professor. The fabrication had been detected by Mr. Woodward, and by this imposition a number of valuable books written on the authority of these fabricated volumes had been vitiated. In these days, said Mr. Levien, when my lords and honourable gentlemen, with that deep erudition which they individually and collectively possess, sit on parliamentary benches, and after having themselves doubtless mastered all the *arcana* of the most abtruse of the *ologies*, look down serenely like the gods in "Lucretius" upon those less happy mortals who are struggling up the steep paths of learning that lead to their empyreal heights, and are laying down laws with respect to competitive examinations, compulsory education, and the various other methods of torture which they invent for the purpose of bringing less enlightened folks up to their own intellectual standard, they may perhaps allow an outsider to remind them that even they themselves, the Civil Service Examiners, the Council Office, the "experts," and the learned societies are not infallible, but that when such base metal as Bertram Cirencester, or Cirencester Bertram, has been allowed for so many years to pass current among us, it may fairly be asked *quis examinabit ipsos examinatores?*

Mr. Gordon Hills mentioned, on the authority of Mr. Freeland, M.P. for Chichester, a remarkable case of historic forgery, or mistranslation, of an Arabic MS.

Mr. Black pointed out at some length his reasons for disbelieving the historical work attributed to Richard of Cirencester. He, with many others, amongst whom was his friend Sir Richard Hoare, were at one time in favour of the work, but no one conversant with the writing of the period at which this was supposed to have been written could for one moment be deceived by it. It was, in his opinion, a base fabrication, which had tended to throw into disrepute the "Antonine Itinerary," which has since been found, in the distances and measurements, to be as correct as Bertram's is incorrect.

On Thursday, the 13th, the Association went by the Roman-road, Akeman-street, to the source of the Thames. Upon this spot, whicl is known as "Thames Head," seven springs rise; but, in consequence of a pumping-engine situated at a short distance from it, and which supplies the Thames and Severn Canal with water, the basin was at this time quite dry, and had been so for some weeks previous to this visit. Before the construction of the canal a copious stream flowed from this spot. At an evening meeting afterwards, Mr. G. R. Wright read a paper on the origin of the name Thames. The chief place visited during the day was—

Malmsbury Abbey,

where Mr. Gordon Hills gave, in his usual sound clear manner, a full account of the buildings. In the course of his remarks, Mr. Hills directed attention to the fact that three of the flying buttresses on the south side were in a most perilous condition, and said the effect of a wet season or frost upon them might be exceedingly disastrous to the only remaining portion of the ancient fabric. 1,000*l.* spent upon the building now prevent its destruction.

On Friday, the excursion was to Daglingworth, Duntsbourne Rouse, and Elkstone, under the guidance of Mr. Thos. Blashill. Before examining the church at Daglingworth the party were conducted to the ruins of a fifteenth-century building, now partly roofless and partly converted into cottages, and which has been locally considered as the remains of a branch house of the nunnery of Godslow, in Oxfordshire. It was stated that an architect had even fixed the position of the refectory and some other portions of the monastic edifice. Mr. Blashill showed from extracts from the register of the property belonging to the nunnery, which is deposited in the Bodleian Library, that they held only the advowson of the living, and pointed out the strong presumption that this was the ancient manor-house. There is a large porch, with a handsome archway and angle buttresses. Within the porch is a recess on the right for a staircase, and over it appears to have been an oratory; a window with a recess, like that of a piscina, but without the usual drain, still remaining on the east-side wall. The porch is near the centre of the southern side of the main building, which measures about 54 ft. by 19 ft., and contains remains of good fireplaces, windows, and doorways, from which the original design might be traced. A deed, of the date of Philip and Mary, which was afterwards produced by Mr. Mullings, proved to be a lease of the manor-house and dovecot, and confirmed the conclusion already arrived at as to its history.

The church of Daglingworth appears in the ordinary catalogues of Anglo-Saxon buildings, and it certainly possesses several of the characteristics usually considered to belong to that early period. Until its enlargement, within the last few years, it consisted of a fifteenth-century tower, a nave, having a crippled semicircular arch thrown over it between the porch and the western end, and a chancel. The western face of the wall above the arch in the nave had an altar, standing on two small Norman columns, with scalloped capitals, and projecting from the wall at the level of the wall-plate. A rough oak roof, of more recent construction than the trussed rafter roof of the rest of the nave, covers this portion. The walls also are thicker, although they form a straight line on the outer face. Mr. Blashill pointed out that this must have been the ancient tower, with a chapel on the first floor. Much of the ancient work was lost in adding an aisle and vestry on the north side; but all the old angles have what is known as "long and short" work, with a rebate run down at about 6 in. from the angle, clearly defining the timber-like construction. Possibly the plaster with which many early churches were covered stopped against this rebate. There is a narrow semicircular chancel-arch and a narrow south doorway. Each has splayed and square strings, to act as capitals, with a flat bead decoration in the chancel, and a flat platted ornament in the porch doorway. Very small, narrow, round-headed windows, with wide inner splays, did exist throughout the church, one or two of which can be clearly traced, and a small stone, with two semicircular-headed piercings, of pre-Norman character, was clearly made out from a few remains of inverted letters to be part of a Roman altar, Mr. Prebendary Scarth and the Rev. Mr. Joyce having arrived independently at the same reading of the inscription. The masonry generally is decidedly of a better description than is usual even in early Norman work,—so good, indeed, as to throw strong doubts upon the early date put down for the building. There is, however, no doubt as to the extremely early character of some sculptured panels which were found built up in the chancel-arch. They represent Christ seated; the Crucifixion, in which are two Roman soldiers, one having a spear and the other having a sponge upon a reed and a vessel for vinegar; and St. Peter, with the keys. The moustache on the figure of our Lord, the tunic in which he is dressed, the knotted girdle, the large heads of all the figures, and, as Mr. Gordon Hills pointed out, the uncrossed position of the feet in the Crucifixion, all show Saxon workmanship. The visit of the British Archæological Association is likely to lead to the complete examination and illustration of the architecture of this interesting building.

The Church of Elkstone

is of the class of Norman structure, remains of which exist at Iffley, Kilpeck, Shobdon, Stewkley, and other places, and are dated early in the latter half of the twelfth century. In this case the influence of the work at Malmsbury Abbey is clearly visible. There is a good doorway with the beak-head ornament, a rich chancel arch, two vaulted compartments in the chancel, the ribs in the eastern one meeting in four grotesque heads. The east end is square, and over the whole of the chancel is a room which appears to have been much higher in the last century, and is fitted as a dove-cot. The nests are composed of portions from the old parts of the church; one piece of sculpture with a scale ornament appears Roman in character (it is near the Roman road known as Irmin-street, and there are Roman villas in the neighbourhood), but possibly the whole of the fittings of the dove-cot might prove, if carefully examined, to have been added since the Reformation. The eaves of the nave have grotesque corbels, as is usual in these twelfth-century buildings.

The buildings visited, though small, were of interesting character, and, though the day was showery, the view from Birdlip-hill over the vale of the Severn was magnificent. The line of the Irmin-street running straight as an arrow on Gloucester, whose town was a fine feature in the view, the distant view of May-hill, the range of the Malverns, and the rich valley with isolated hills, altogether made up a scene of beauty English in character, but rare even in England.

In the evening amongst the papers read was one by Mr. J. R. Planché, Somerset Herald, on

The Norman Earls of Gloucester,

wherein he argued in favour of the existence of an Earl of Gloucester (a William Fitz-Eustace) previous to Robert the Consul; and, referring to the errors committed and perpetuated by persons who did not sufficiently understand the subjects discussed by them, went on to remark,—"My amiable friend, the late Thomas Haynes Bayly, in one of his pleasant Songs of Society, said

> 'It's a pity when charming women
> Talk of things which they don't understand.'

Without, by any means, endorsing this opinion, I do not hesitate to assert that it is a much greater pity when sensible men commit the same imprudence. A right honourable senator, who deservedly enjoys a high reputation for general knowledge and remarkable oratorical powers, not long ago, stated at a public meeting that he believed something useful was to be learnt from the study of every science—except that of heraldry. Here was an undoubtedly sensible man talking of what he did not understand, and it is the more to be lamented because he was unnecessarily giving the weight of his great opinion to a very silly prejudice, which I am happy to say is becoming rapidly destroyed by the proof constantly afforded of the exceeding value of heraldry to the student of our National Antiquities, whether historical, genealogical, or artistic. In conclusion, I must beg you to understand that, while arguing in favour of the existence of a Norman Earl of Gloucester previous to Robert the Consul, I am not backing up a favourite theory, or interested in anything beyond arriving at the truth. Had my inquiry resulted in an adverse conviction, I should have stated it with equal satisfaction. The great object of such a society as ours, and our strongest claim to your support, is the establishment of facts by the critical examination of statements repeated without question by writer after writer until error becomes so venerable from antiquity and the sanction of apparent authority, that the archæologist who would destroy it is accused of sacrilege and twitted with being untrue to his order. At the same time it is his duty to respect tradition, which is so frequently founded on fact, however distorted; and carefully to preserve every fragment of local history which is not contradicted by official record or opposed to common sense. Such a fragment I consider Dr. Powell's note on the Battle of Cardiff; and while by no means insisting on the accuracy of every particular, I venture to think that, disentangled of the obvious misconceptions which have hitherto mystified and disfigured it, the 'plain unvarnished tale' is not unworthy of further investigation by the antiquaries of Gloucestershire."

We are not pretending to mention all that was done and said, and must pass on to the very interesting visit paid to the site of the newly-discovered Roman villa at

Chedworth,

where the area of the discoveries was pointed out, and, by the aid of a plan, the situations of the different apartments, baths, hypocausts, &c., were traced by the Rev. Prebendary Scarth, Mr. Grover, and Professor Buckman. The villa is situated on the Great Foss-road, about eight miles from Cirencester, and sixteen from Gloucester, on the small river Colne. The buildings form three sides of a square, and the property belongs to the Earl of Eldon, with whose sanction excavations have been made by Mr. J. Farrer, and the site traced out, or the greater part of it. A large quantity of Roman relics have been dis-

covered, all of which, with a few exceptions that have been carried off to London, have been deposited in a museum erected on the spot for their reception. We have before now referred to this villa in connexion with the interesting fact that the Roman remains display *Christian symbols*.

Prebendary Scarth read a paper descriptive of the discovery, and showed that, although much of the villa had been brought to light, the whole had not been disclosed: fresh foundations of walls were being constantly found. There were undoubted proofs that the villa had been destroyed by fire, and the discovery of 257 coins, mostly of the Roman period, enabled them to fix pretty accurately the date of its destruction. No Saxon coins had been found. The position of Chedworth was marked on the map of Roman Britain in *Monumenta Historica*, but it was not mentioned in Horsley's map. Mr. Scarth proceeded to describe the general plan of the villa, which appeared to be divided into two parts, one the residence of the owner, the other allotted to the servants of the farm, which was generally attached to these rural villas. A perfect Roman villa, according to Columella, contained three parts:—1. The villa urbana, or owner's residence. 2. The villa rustica, or residence of the bailiff. 3. The villa fructuaria, or barns or storehouses. The peculiar situation of that at Chedworth had led to its preservation. It was situated on the declivity of a hill, and after destruction had probably been left until the underwood had hid it from view, and gradually covered up the remains. This would account for so much good masonry being left undisturbed. The pavements were very perfect and of a high order of merit, and probably were executed by the same artists who had laid down those found in and around Cirencester. One of these,—viz., that adjoining the principal bath,—had already been drawn and described by Mr. Grover; but there was another in the same line of building equally worthy of note, containing the figures of a dance somewhat resembling our present waltz. The writer went on to describe the finding of the Christian emblems, but we are tempted in lieu of following him to avail ourselves of information furnished some little time ago by the Rev. S. Lysons, who was present when the monogram was discovered. We give it under a separate heading. Suffice it to add, that the British Archæological Association have spent their week in Cirencester with singularly good effect.

ROMAN REMAINS AT CHEDWORTH.*

To the accident of a lost ferret we are indebted for the discovery of one of the most interesting Roman or Romano-British villas existing in this country. The under-keeper, in thrusting his arm into a rabbit burrow to pull out the recreant animal, at the same time drew out a number of tesseræ, which being submitted to the inspection of those who understood such matters were at once pronounced to be of Roman type, indicating the existence of a pavement at that spot. Further search proved the correctness of the suspicion, and fortunately Mr. James Farrer, being a man of scientific pursuits, was not one who would allow the suggestion to remain without further inquiry. It is interesting, not only as revealing to us a work of art of the times when the Romans held sway in this country, but still more so from the historic fragments which may be collected from hence, and which, when pieced in with history and tradition, help to restore a link which was well nigh obliterated, in consequence of the loss of that historic literature which I cannot help thinking we must have once possessed. It is well known that in the second invasion of this island by the Emperor Claudius, the Romans, after a rapid march across the country, advanced with comparatively little opposition on the part of the Britons as far as the county of Gloucester, then inhabited by a people by some historians called the Boduni, by others called the Dobuni, according as might be the auricular perception of the pronunciation of their name by those who recorded it. History also tells us that some of the British princes were favourable, rather than otherwise, to the Romans, and others were soon conquered into obedience. History, such as we have it, relates that Arviragus, king of this country, a king whose name is recorded by Juvenal, made terms with the emperor, and was permitted to retain possession of his kingdom; that this king having reigned honourably forty-four years, and having during that time visited Rome, returned to his kingdom, and was eventually buried at Gloucester. At this time Vespasian, father of Titus, the conqueror of Jerusalem, was lieutenant of the emperor in Britain, and to him British historians attribute the foundation of the town of Cirencester, or, rather, its conversion from a British settlement, called Caer Corin, then the capital of the Dobuni, into a Roman fortress, with the Romanised British name of Corinum. Discoveries in that town give reason to believe that there is every probability of the truth of the tradition. Its Roman occupation, its Roman walls are unquestionable, and why should not Vespasian, who Roman history tells us was in Britain at that period, have transformed it from a British settlement into a Roman town? But to return to Arviragus. He is not only said to have been king of this country, but also to have been a Christian, one of the earliest British Christians. Bigland, the county historian, tells us that in this very parish, within a mile of this Roman villa, about the year 1760, the vestiges of a Roman bath were discovered at Listercombbottom; there were a spring and other necessary appendages. Most of the bricks of which it was built were legibly marked ARVIRI, describing, probably, says Bigland, by connected initials, the titles of the legion which was stationed here. But, as I cannot discover in these letters any Roman legion, in Britain or elsewhere, in any way corresponding with them, and as they do form the very legend upon the coins attributed to Arviragus, I was most anxious, on the discovery of this interesting villa, to ascertain whether any other evidence might be found connecting this place with the traditionary British king which might in any way confirm the story of his Christianity.

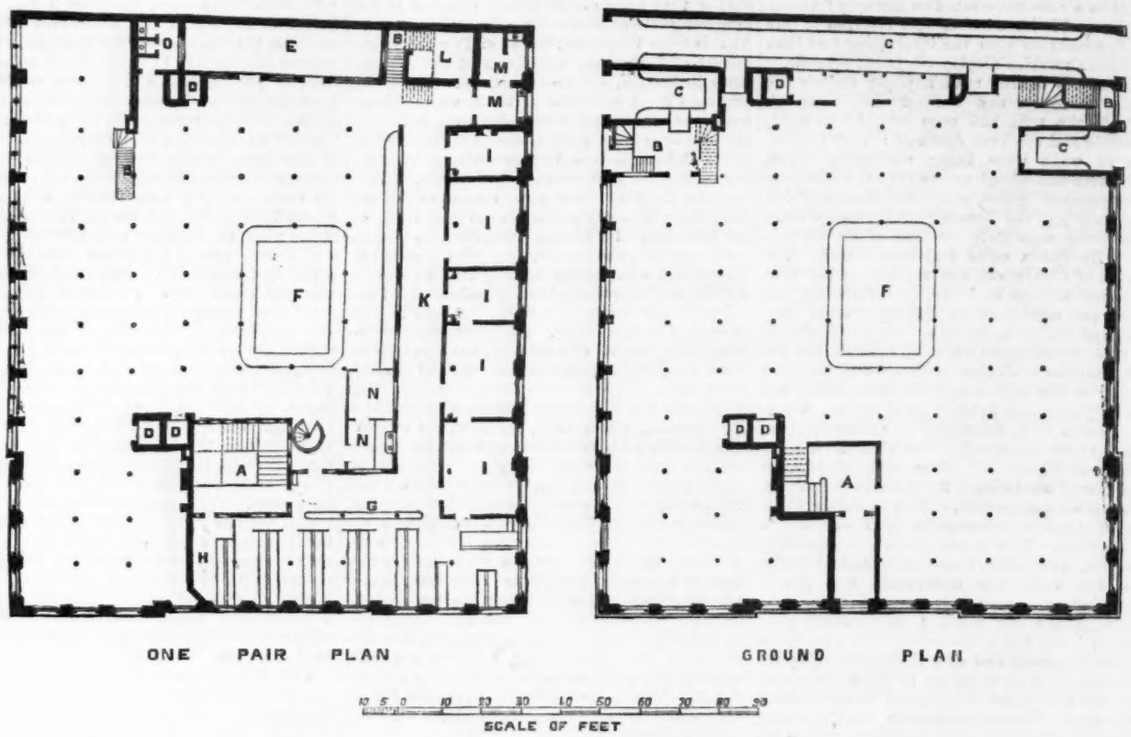
From our early chroniclers we learn that the Emperor Claudius made friends of some of the British princes, and left them in charge of the governments they had previously held, as the kings of Oude and Delhi, and other rajahs, have been left by our Government in India. This view is confirmed by the Roman historians Tacitus and Xiphillium; and we read in Juvenal that Arviragus was still at his government in the reign of Domitian, in which there is nothing inconsistent, considering the great length attributed to his reign by all the chroniclers. Arviragus then, being king of the Dobuni, of which Corinium (Cirencester) was the capital, one is not surprised to find the bricks discovered at that city also inscribed with the same mark of ARVIRI. Several of these exist in the Cirencester Museum. Whether or not that sovereign had at so early a period exacted a tax on bricks, and had them stamped with his legend, we cannot now say. They must have got their revenue from something, and therefore such a suggestion has nothing impossible or improbable that I am aware of in it. That both the Romans and Britons imposed taxes upon their people is unquestionable. The British coins marked *taxio* have been considered by some writers as signifying that they were used for paying the taxes. The British word *tasg* undoubtedly means a task, an imposition, or tax. I see no reason why we should be more surprised to see the sovereign's name upon these bricks than to see V. R. (our own sovereign's mark) upon any exciseable article. The Romans had a tax upon salt, and the Emperor Vespasian, the founder of Cirencester (so says Suetonius), imposed a tax upon wine; a tax upon eatables was imposed by Caligula, and why not on bricks? I may remark that the pigs of lead of the Roman times, of which there are several specimens in the British Museum, invariably have the mark of the emperor in whose reign they were moulded. It would be interesting to know whether any bricks of the Roman times with the legend of Arviri are discovered in any other county. Mr. Farrer kindly invited me to visit this place during the progress of the excavations; and at the time when the workmen arrived at the foundation-stone of the principal entrance of the villa, knowing the custom of most nations to inscribe the foundation-stone with some emblem of their faith,—the Egyptians with the Scarabæus, the Jews with the ineffable name, &c.,—I caused the workmen to turn up the stone, when, to my great interest and delight, I discovered the Christian monogram, the two first letters of the name of Christ, evidently marking that the builder of that villa was a Christian. This monogram was precisely of the character of those seen on the coins of the Emperor Magnentius and his brother Decentius, who—Britons by their parentage, as we read in Zonarus—reigned A.D. 350. This type, however, I find on the Christian tombs, in the catacombs of Rome, reaching back to the times of Hadrian, who commenced his reign in 116 A.D., if not indeed, to a remoter period, and is, I believe, as old as the Apostolic times. This was not, however, the only specimen of the monogram: on further research I found no less than four other instances of it. It has been the prevailing opinion that the monogram originated in the time of Constantine the Great, but my own reading, confirmed by Signor Erasmo Pistolesi, on the Vatican at Rome, shows that Constantine only adopted a symbol well known among Christians from the earliest period of Christianity. But the historic chain does not cease here. I received a letter from Mr. Farrer, informing me that a sculptured stone had been found, with letters inscribed on it, requesting me to examine it on my next visit. On having the stone washed, I found the letters PRASIATA, which is the abbreviation of Prasiatagus, as ARVIRI is of Arviragus. Here we have the name of another British king, known in history as the sovereign of the Iceni, who made his will, dividing his property in favour of the Roman Emperor Nero and his own two daughters. Prasitagus, Prasiatagus, or Prasiatogus, as his name is variously written, was the husband of the celebrated Boadicea, also called Bonduca, and Bonidicea, and Voadica, according to the phonetic perceptions of the historians who record it. She was the queen who revolted against the Romans for taking rather more than the lion's share under her husband's will.

I think I have read somewhere that Boadicea was daughter of Arviragus, though I cannot find the passage. It is, however, probable that she had something to do with this county, for the coins bearing her legend, "Bodvo," according to Akerman, are not found out of the confines of Oxfordshire and Gloucestershire.

The traces of the early British Christianity, which are so decidedly asserted both by heathen and patriotic writers, have been hitherto but scantily discovered. Yet every year is producing more specimens. I am inclined to think that they have not been sought after, and when found have been overlooked or not understood. In the present instance the probability is that, had I not been present and searching for these evidences, the stones would have been thrown away with the rest of the rubbish and lost. The same monogram is found in mosaic on one of the pavements at Frampton, in Dorsetshire. Nor does it argue against the Christianity of the possessors of these residences that the Christian emblems are found mixed up with those of the heathen gods and goddesses, because no doubt intermarriages between heathen and Christians at that period must have been very frequent. Moreover, during the four hundred years' residence of the Romans in this country there must have been many changes of occupants of these villas, having different religious views. But I have remarked at this villa the singular absence for the most part of heathen emblems.

I have remarked, too, upon the existence of a chamber or building having an apse, presenting every appearance of a bapistery, of an octagonal form, which would scarcely, I think, have served the purpose of a bath, there being already two other bath establishments for the villa in another locality. In the corner of this building was an altar, but I failed to discover any heathen emblems about it. Whether this building was a baptistery is, of course, a matter of considerable question; but, if it was not, what was it? It was scarcely a bath,—it is not deep enough: besides, there are other baths in sufficiency; neither was it a well, for the same reason; nor a reservoir for the supply of the baths, for either of the large baths would exhaust four times as much as this contains; besides, a well or reservoir would not have required so grand a building. And then, what about the altar in the corner of the building, and the space occupied by the apse? This space would give room for the witnesses of the baptismal ceremony, who by standing in that position would face nearly or quite due east. Again, just over the altar are three peculiar niches. These are very remarkable, as possibly suggesting a Trinitarian worship. These circumstances, at any rate, deserve much consideration. Whether all these circumstances united together may carry any weight in confirmation of some of the traditions of our early historians is for readers to judge.

* See above.



A MANCHESTER WAREHOUSE.

The coincidence, however, of the legend of Arviri and Prasiata, with the recurrence of the Christian monogram, are curious and interesting, because, whether or not my theories will hold water, there is no doubt as to the Christianity of the builders of this villa. And when we know how comparatively rare is the discovery of Christian emblems in the Roman or Romano-British excavations in this country, notwithstanding the strong and indubitable records to the fact of its early Christianity, we must treasure up every discovery of this sort and make notes of them, that they may be had in remembrance; and I trust that I have only to call the attention of my brother antiquaries to the importance of these facts, which to some may appear trifles, but which are to others so many stones crying out to the truth of fragmentary history, and as such serve to elucidate our views, as the terebratulæ and other minute shells mark the zones of the geologist, and the pistils and stamina serve to mark the genus and species of the flowers of the botanist.

I content myself with bringing before you the peculiar features of this discovery, being the second only in Great Britain which bears the evidence of the Christian faith of its builders; and without in any way wishing to force my own views upon others, I throw out these suggestions that they may be followed out by any upon whom they may make an impression, and whose opportunities may enable them to note and preserve every Christian record.

A MANCHESTER WAREHOUSE.

MESSRS. A. COLLIE & CO.'S

We give, by way of illustration this week, a view from the south-east and a plan of the principal floors of a warehouse recently erected in Manchester, for Messrs. Alexander Collie & Co., by Messrs. Mills & Murgatroyd, architects. The building is intended for the conduct of an extensive shipping business. It covers about 2,200 yards superficial of land, in a central situation between the principal railway stations of the city. It is five stories high above the level of the street (measuring about 70 ft. from the flags to the top of the attic), and has two stories as cellars below the street level.

It is externally faced with Darley Dale stone. The doorway is cased with red granite. Three of the fronts are disengaged; on the fourth side is a loading gateway passing through the site, for the admission of carts delivering and receiving goods. The gateway is the whole height of the building, with loading-doors into it from each floor, and is covered at the top with glass.

The cranes are so arranged as to admit of many lurries being loaded at the same time, and in all states of the weather.

The centre of the warehouse is lighted by a well or space 30 ft. long, and 20 ft. wide, pierced through each floor, and covered at the roof-level with a handsome skylight. The well and the outside walls beneath the windows are surrounded with mahogany counters. In the lower cellar the machinery is fixed, comprising two 30-horse engines, two 40-horse boilers, together with the gearing and the hydraulic pumps connected with the packing presses. By this arrangement all parts of the machinery, shafting, and driving bands are fully exposed, and can be kept clean or repaired without the usual inconvenience of lifting the flooring or pulling some portion of the walls down. The driving-shafts, &c., are supported chiefly on standards fixed to the lower cellar-floor, not to the walls: thus greater steadiness in the working is obtained, and no vibration in the building. The machinery is so adjusted to the engine as to admit of any part being thrown out of gear at pleasure without impeding the action of the rest, and thus economy of power is effected.

The upper cellar is devoted exclusively to packing by powerful hydraulic presses, arranged round the sides of the packing-room. The whole of the hoists, cranes, pumps, &c. are worked by steam from the boilers, which are placed under the loading gateway, on a level with the lower cellar.

On each floor are arranged counting-houses for the different departments, with all the necessary conveniences, in the form of lavatories, &c. The heating of the warehouse is by steam, and ventilation is provided for by constructed air-shafts. The principal floor is about 17 ft. above the level of the street, and contains, in addition to the warerooms, the chief counting-house and private offices.

It may be interesting to some of our readers to know that the quantity of pieces of goods alone such a warehouse can receive, examine, pack, and prepare for shipment, is practically almost without limit. 5,000,000 pieces, equal to 100,000 bales, weighing 16,000 tons, can easily be prepared and disposed of to different parts of the world in one year. The length of this number of pieces would be upwards of 200,000,000 yards, or equal to more than four times the circumference of the globe. The floors of necessity have to be constructed with great strength, being weighted frequently up to about 2½ cwt. to the square foot of flooring.

The contractors for the building were Messrs. Robert Neill & Sons, and for the engines and machinery, Messrs. E. T. Bellhouse & Co., all of Manchester.

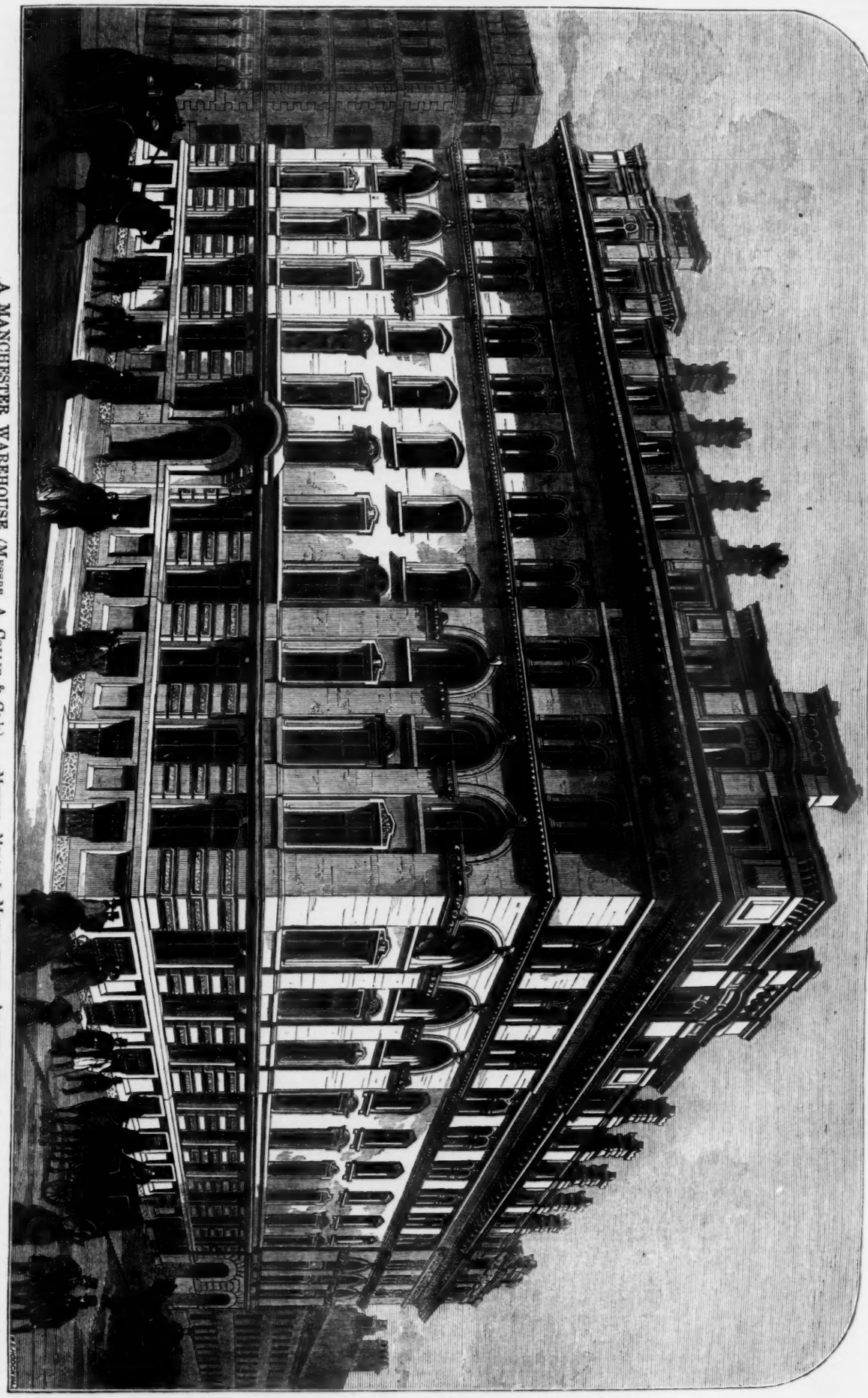
REFERENCES.

A. Main entrance and staircase to offices.
B B. Side entrances and stairs to warerooms.
C C C. Cartways, with cranes for loading and unloading.
D D. Lifts.
E. Area, for light.
F F. Openings through floors, for light.
G. Counting-house, 80 ft. by 33 ft.
H. Cashier.
I. I. Private offices.
K. Corridor thereto.
L. Strong-room.
M. Private dressing-room, lavatory, &c.
N N. Clerks' lavatory, &c.
O. Warehousemen's ditto.

FINSBURY DISTRICT SCHOOLS COMPETITION.

Eighteen designs were submitted in competition for these new buildings, from which the Committee of Management selected eight as most suitable, viz., the designs of Messrs. Burgess & Co., C. H. Cooke, — Dinnage, F. E. Fowler, Joseph James, William Lee, F. Peck, and Henry Saxon Snell. These were ultimately cut down to three,—Mr. Peck obtaining the first premium, with an estimate of 18,000*l.*; Mr. Joseph James the second premium, with an estimate of 21,000*l.*; and Mr. William Lee the third premium, with an estimate of the same amount, viz., 21,000*l.*

The Carlisle Statue at Carlisle.—At a meeting in Carlisle of the subscribers to the Cumberland Memorial of the late Earl of Carlisle, it was resolved that Mr. Foley, R.A., be engaged as sculptor, and that the statue should be placed on the moat at Brampton. There is a sum of 700*l.* available for the purpose.



A MANCHESTER WAREHOUSE (Messrs. A. Collie & Co.'s).—Messrs. Mills & Murgatroyd, Architects.

THE SCIENCE OF COLOUR.

I am not surprised at the hesitation of your correspondents, Mr. Crace and Mr. Colling, in accepting what is to me evidently the only true theory of colour. I started myself with the same prepossession in favour of the doctrine that red, yellow, and blue were the simple or primary sensations of colour, and that their complementaries were green, purple, and orange. I began with endeavours to ascertain by rotation of coloured discs and other means the correct hues of these six important colours, and spent much time to little purpose, for nothing would come according to the theory; red and green would always make a dull yellow or olive green, yellow and purple would make a dull red, orange and blue would make a dull purplish hue, while blue and yellow would always most provokingly produce a neutral grey.

Then, again, I endeavoured to find out what could be the meaning of the doctrine that red, yellow, and blue would neutralise each other in the proportion of 5, 3, and 8, and what was the ground on which it rested; for it seemed natural to suppose that if white was a sensation compounded of those three sensations, then the intensity in which they existed in white ought to be regarded as equal. Having with some difficulty procured a copy of Field's work, my faith in the doctrine was somewhat staggered by finding that the only ground stated was that the thicknesses of certain coloured solutions, which, when superposed, transmitted a neutral light, were proportionate to 5, 3, and 8. Field seems not only to have disregarded a fact which is obvious to the eye, and was lucidly explained by Sir Isaac Newton two centuries ago, in his answer to Hooke, that the colours of solutions and other transparent bodies vary in hue as well as in darkness with the thickness of the bodies that produce them, because these bodies extinguish the differently-coloured rays at different rates, but also to have committed the amazing oversight of supposing that the quantity of the colour transmitted was some way proportionate to the thickness of the solution. And on no better ground, it seems, this very equivocal doctrine has been ever since accepted by artists almost without examination or question.

I wondered, too, why yellow was the brightest of all colours, since orange and green, which were supposed to contain the red and blue of the full white, in addition to the yellow, ought to be still brighter; and why purple, which contained two primaries combined, must be darker than either of them separately. Is it possible, I thought, that red and blue light produce a mutually darkening effect on each other, and all illumination depends on the yellow? But if so, how is it that white is brighter than yellow?

It would be tedious to mention the absurdities and inconsistencies that naturally arise in following out a false theory. I will only add that after many vain attempts to produce anything like a perfect and harmonious system of colours upon the red, yellow, and blue theory, I was surprised to find a passage in Dr. Thomas Young's lectures maintaining that green, and not yellow, is the simple sensation, and afterwards met with Professor James Clerk Maxwell's account of his experiments, which confirm that opinion by proving distinctly (what, indeed, the unaided eye, when once attention is called to the fact, immediately recognizes) that of all the colours of the prismatic rays which compound the sensation of white, the red, green, and blue are the deepest, or most nearly pure; so much excelling the rest in this respect, that their mixtures are capable of producing all the intermediate colours with the depth they possess in the spectrum. As this doctrine perfectly agrees with all the results I had obtained, both by mixing coloured lights, and by presenting coloured surfaces to the eye in such rapid succession that the sensation excited by one had not faded before that excited by another had been produced, I had now little difficulty in accepting it, especially as it quickly appeared to me to give results far more harmonious and satisfactory to the eye than those deduced from the other doctrine. And as all carefully considered experiments with the prism, both in analysing the colours of pigments (such as that mentioned in my former letter), and in obtaining the colours of combinations of the prismatic rays (such as those tried by Mr. Crace when he viewed white and black spaces through the prism), perfectly agree with the new theory, I make bold to assert that it is impossible for any reasonable man who knows the facts to withhold his assent from it.

I should like here to call special attention to a very simple and satisfactory experiment, which is perhaps more instructive than any other single experiment, except that of obtaining the spectrum of a brilliant white line. I shall assume that the reader is acquainted with and admits the foundation-doctrine of all that is known about light and colour: I mean Newton's great optical discovery that the white solar light is a mixture of an infinite number of different kinds of rays, all differently refrangible, and all distinguished by the peculiar sensation of colour which they produce in the eye; and that the prismatic spectrum of a line of such light is nothing else but a series of similar lines adjoining each other so as to fill a rectangular space, varying in colour from the red of the least refrangible ray to the violet of the most refrangible ray, through all the series of the prismatic colours, which to all persons of ordinary trichromic vision at once arrange themselves in three conspicuous bands of red, green, and blue: the orange, yellow, and yellow-green which lie between the best red and green rays, and the mixtures of green and blue which lie between the best green and blue rays, being (in the pure spectrum of a narrow stripe of white) almost lost, on a general view, in the superior strength of those three predominant colours. I will also assume that the reader admits that the several rays, when mingled, each produce their proper effect on the eye, and that the resulting sensation is therefore a compound of the several sensations proper to the component rays. Without these premisses no explanation can be given of the phenomena of light and colour, or of the particular experiment I propose to notice here, which is most easily performed in the following way.

Take two rectangular pieces of white paper, with clean edges (half-sheets of note-paper will do); support them over a dark cavity so that they touch at one corner, the right-hand edge of one piece being in a line with the left-hand edge of the other, and the bottom or near edge of one in a line with the top or far edge of the other; and let the paper itself be strongly illuminated. Now, holding a prism parallel with and at a moderate height above the line formed by the top and bottom edges that meet, view the spectra of the two white spaces. A charming assemblage of colours appears, arranged in the following order:—

WHITE,	BLACK,
Pale greenish yellow,	Dark violet blue,
YELLOW,	BLUE,
Orange,	Seagreen-blue,
SCARLET,	SEAGREEN,
Dark red,	Pale seagreen,
BLACK.	WHITE.

The opposite colours are perfectly complementary to each other, each containing exactly what the other wants to make up the full white of the paper; for if one of the white spaces is pushed laterally so that its spectrum is added on to the spectrum of the other white space, the two instantly neutralise each other, and white alone appears through the prism where the colours appeared before.

But how are these colours produced? Simply by adding together successively larger and larger portions of the pure prismatic rays, beginning at the red end on one side, and less and less portions beginning at the violet end on the other side. For the prism merely displaces rectangular spaces of the different prismatic colours (which without it are all seen together in the white), according to the refrangibility of those coloured rays, and the colours appear in the space between the greatest and least displacement on each side. This will be best seen if we distinguish the several prismatic rays by different letters, as by a for the extreme red, b for the next red nearer to orange, c for the next, and so on, down to f for the extreme violet. We can then show the formation of these colours as follows:—

$a+b+c+d+e+f$	*Nil.*
$a+b+c+d+e$	f
$a+b+c+d$	$e+f$
$a+b+c$	$d+e+f$
$a+b$	$c+d+e+f$
a	$b+c+d+e+f$
Nil.	$a+b+c+d+e+f$

By producing at the side a simple spectrum from a white stripe in the line of the top and bottom edges which meet, it is easy to see what prismatic rays are combined to form any given colour in either of these two compound spectra; and it will be found, on the one hand, that the addition of all the green rays to all the red makes the best yellow; and that the further addition of the blue rays converts that yellow to white; and, on the other hand, that the addition of the green rays to the blue makes the best sea-green, which the further addition of the red converts into white.

This single experiment shows conclusively, without a possibility of mistake, the nature of all those colours which are formed by combining the rays of different portions of the spectrum beginning at one end or the other, and also places those which are perfectly complementary in juxtaposition with each other; and it seems impossible to avoid the conclusion that the best yellow is opposite and complementary to the best blue that can be presented to the eye, and the best red or scarlet opposite and complementary to the best sea-green; the colours produced by adding together continuous parcels of the prismatic rays being the best of their kinds that are possible. In like manner, by looking through the prism at a stripe of white (about a quarter of an inch wide) on a black ground, continuous with a similar stripe of black on a white ground, and properly adjusting the distance of the prism, the best possible green may be seen in juxtaposition with its complementary pink.

If any confirmation is asked for as to the truth of these being complementary colours, besides that afforded by such experiments as those mentioned in my former letter, cut out some circles of white card-board, and having painted opposite halves of each with the pigments which best represent them, such as the brightest scarlet vermilion and verdigris, the brightest cobalt blue and king's yellow, the deepest emerald green and brightest rose madder (the latter should be toned with a slight mixture of cobalt, as it is not usually sufficiently blue), pierce their centres with small pieces of wood, tapered, and set them spinning. If the colours are laid on in proper strength, all the three teetotums will exhibit the same neutral grey.

I am obliged to Mr. Crace for the commendation which he so liberally awards to my treatise in his last letter, and am glad that my attempt to elucidate this inviting subject should be so candidly discussed; but I think that further consideration would lead him to abandon such crude and shadowy views of the nature of light and colours as were maintained by Goëthe in Germany, and by Field and Hay in England, who, with all their merits in other respects, were no philosophers. They are merely delusions which Newton put out of the domain of science two centuries ago, as that marvellous monument of genius, his treatise on optics, conclusively shows. However opaque the substance may be which reflects yellow light, the light itself cannot be opaque; rays of all colours cross in all directions without interference.

The first part of Mr. Colling's letter, in your number for August 15, is, I think, answered by the experiment proposed and explained in this letter, and in my treatise; but he makes one observation which requires remark. He says, "But green is immediately formed by allowing the yellow to approach the blue ray." A little consideration of the nature of the experiment will show that green appears when the white space is so narrow, or is viewed at such a distance, that the red in its spectrum no longer overlaps the green: so that it is, in fact, formed by subtracting the red from the yellow. Hence the green is darker than the yellow was, not lighter, as it would be if produced by adding the blue to the yellow.

I need not enlarge upon the natural phenomena which Mr. Colling next endeavours (though but lamely) to account for on the supposition that yellow and blue make green, and then uses as arguments to prove that doctrine. The colours of the sky, which vary from blue, through pale sea-green, to the glowing hues of sunset, have never, so far as I know, been fully and satisfactorily accounted for. Contrary opinions have been maintained by those most capable of judging. It may, however, be safely said that the sky-green is not formed by seeing blue sky through the yellow rays of the setting sun, since if those rays could possibly constitute a medium which would act like a wash of gamboge over a blue surface, the green they would so produce would be darker than the sky-blue, instead of brighter, as sky-green is. But, in fact, as we find by many direct and unexceptionable experiments that yellow and blue lights thrown together into the eye produce the sensation of white and not of green, the real cause must be other than that suggested by your correspondent.

Mr. Colling seems also under a mistake as to the nature of the colour of the greens of vegetation. Whether dark, as in ivy, or light, as in a blade of fresh grass, if analysed with a prism they are all seen to be yellow-greens, scarcely ever exhibiting even the pure prismatic green, which is of the hue of the pigment called emerald green, much less containing an excess of blue, as he seems to suppose; in fact, a large part of the light they reflect or transmit to the eye is red, and a very small part blue. Of this he may easily convince himself, by comparing the spectra of leaves with the spectrum of white light, by a method similar to that proposed for analysing the colour of king's yellow in my former letter.

The height of the sun makes a considerable difference in the solar spectrum; the atmosphere, or the aqueous vapour in it, absorbing some rays more than others. The extreme violet and red rays can only be seen when the sun is high and bright. Change of season cannot reasonably be supposed to produce any direct effect on the solar light which reaches us, so that the expressions which Mr. Colling uses, "the blue cold ray of spring," and "the sun's rays becoming redder and more powerful in autumn," have, I fear, nothing in nature to justify them. The sun's light, in our latitude, is obviously more powerful in May than in September; and it differs but imperceptibly in colour at midday, all the year round.

The admitted importance of right views on a subject on which such difference of opinion exists, will I hope be a sufficient apology for this long communication. W. Benson.

P.S.—I have omitted to notice the circumstance mentioned by Mr. Crace that all the coloured spots on a black ground in my diagrams, when viewed through the prism, exhibit strong traces of blue. All ought to do so; except those which belong to the group of colours containing no blue, and the traces of blue can hardly be said to be *strong* in these. Scarcely any blue comes from the spots of Indian lake, vermilion, cadmium, and king's yellow; very little from the spots of emerald green and viridian, not more than the red on their opposite side. But very strong traces of green and of red may be noticed on the opposite sides of the king's yellow and cadmium, though somewhat less green in the latter, red and green being essential to the constitution of those colours. Whatever blue is in them arises from the imperfection of the pigments, and from the white superficial reflection. The yellow seen over the coloured spots on the white ground comes, of course, from the white ground, as may be seen by its being strongest over the black spot.

THE FAIRFORD WINDOWS.

It is proposed to form a committee, with the co-operation of the Vicar of Fairford, and of the inhabitants of the district, for the purpose of making complete and faithful records and illustrations of the Fairford glass, the authorship of which has been ascribed to Albert Durer, and towards conserving what must be considered masterpieces by whomsoever executed.

THE LATE MR. GEORGE ROWDEN BURNELL.

The death of Mr. George R. Burnell, known as the writer of several scientific works, and which occurred at his residence in Kensington Gardenterrace, on the 23rd of July last, in his fifty-fourth year, should not pass unrecorded. His attainments were numerous. He had an extensive knowledge of languages, and had resided in America, France, and Belgium, besides visiting Spain and Sardinia.

About seven years of his life were spent in France, during which time he was engaged on the Paris and Rouen Railway, and as superintending architect of the Havre Docks. On the cry being raised of "*La France pour les Français*," in 1848, he returned to England. Though he executed several works both here and abroad, his bent was decidedly literary. He contributed several articles to the *Builder* early in his career, especially on roofs. In 1857 he wrote a rudimentary work on "Limes and Cements;" in 1861, "The Annual Retrospect of Engineering and Architecture." He edited "The Builder's and Contractor's Price-book" and "The Engineer's and Architect's Pocket-book." He was connected, too, with the *Journal of Gaslighting* for many years, and wrote several papers for the Institution of Civil Engineers, for which he received prizes: he was the author of many articles in Brande's "Dictionary of Science," and in the "Dictionary of Architecture," published by the Architectural Publication Society, especially one on the word "Abattoir."

Mr. Burnell was a relative of Mr. W. Tite, M.P., and at his suggestion was made a member of the Government committee, appointed to inquire as to the preservation of the stone of the Houses of Parliament,—a committee, by the way, that sat long, published a useful report, and never received the slightest acknowledgment of its services.

Mr. Burnell endured previously to his decease a long and painful illness.

WORDS OF WARNING FROM WORTH.

A Sussex Antiquary says it is stated that Worth Church, one of the few Saxon buildings remaining to us, is to be restored, and hopes it is in good hands, and will be rightly cared for. Our correspondent continues, — "The ugly gallery, I am told, is to be taken away, and something done to the spire; and the archway of the south transept, which is wider at bottom than at top, is to be made upright! Surely that will not do, will it? Had it not much better be left alone? The south transept, it seems, belongs to Rowfant, and the parish must, under penalty of forfeiture, repew it; which is to be done by substituting open seats. The north transept is to be opened out into the church again."

We participate in the writer's anxious desire that nothing damaging should be done, and shall be glad to learn that the superintendence of the work is in proper hands.

THE EPIDEMIC AT GUILDFORD.

Since we drew attention to the sanitary condition of Guildford the epidemic has somewhat declined. From June 1st it has attacked more than 400 persons, and there have been twenty-two deaths. Besides the fever, diarrhœa has also been unusually prevalent, and several cases of English cholera have occurred, as well as diphtheria. The fever has attacked all classes, and in some cases it has been rapidly fatal: the chief inspector of the county constabulary died within forty-eight hours of the commencement of the attack. No endeavour has been made by the local authorities to check the progress of the epidemic. The local Board is most blameable for not taking measures even to ascertain the presence, or watch the progress, of so fatal a disease, far less to arrest it in the way prescribed by the Sanitary Act.

METHODIST NEW COLLEGE, BELFAST.

This new college has been opened. It is situated on an elevated site at University-road, in the vicinity of the Botanic Gardens. The building is 260 ft. in length from east to west, by 170 ft. from north to south. On the students' side are thirty-two rooms for thirty-six students (nearly all in separate apartments), average size, 16 ft. by 10 ft.; two large class-rooms, 22 ft. by 16 ft. average; a library, 38 ft. by 18 ft. 6 in., and 14 ft. high. On the boys' side are three dormitories, average size 50 ft. by 25 ft., lofty and well lighted, affording accommodation for eighty boys as boarders. Two of these dormitories are so arranged as to give each boy a separate chamber or "cubicle," of convenient size, so as to secure, to a great extent, the privacy and comfort of a separate room. There are three masters' rooms, in immediate connexion with the dormitories. There is a library, or reading-room, for the boys, 36 ft. by 18 ft.; four class-rooms, average size 30 ft. by 18 ft.; schoolroom, 55 ft. by 27 ft., and 20 ft. high, giving accommodation to 100 day boys, in addition to the boarders. There are common to both departments, a public lecture-hall, 55 ft. by 27 ft.; dining-hall, 50 ft. by 22 ft. There is a separate infirmary, or hospital, distinct from either department. Water-closets, baths, and lavatories, with hot and cold water laid on, are provided for each department. The principal staircases are of stone, and careful provision made against fire. The corridors and rooms are well warmed and ventilated throughout. There are three residences—for the principal, head master, and theological tutor respectively. The boys' playground is of ample extent, and is to have a large covered space for exercise in wet weather, with gymnasium and ball-court.

The cooking-ranges for the principal kitchen, as well as all the other kitchens throughout the building, are by Flavel, of Leamington. These were specially selected by the building committee from the agents, Messrs. Richard Patterson & Co., Belfast, who held the contracts for the entire cooking apparatus, gas-pipes, and electric bells. The builder was Mr. Henry, of Belfast; and the architect, Mr. Wm. Fogarty, of Dublin.

CESSPOOLS IN RAMSGATE.

A correspondent,—Mr. Thomas Hall,—writes thus:—Happening to stay this week at the crowded watering-place Ramsgate, I was thunderstruck at the extraordinary sanitary arrangement, or rather disarrangement, of the town. I was informed that each house is supplied with an immensely large cesspool, which is supposed to be emptied every three years. Over this is placed the water-closet seat, without either trap or water laid on. The one at the house I was staying at had not, I was assured, been emptied for over *nine years*; and, being constructed as above described, there arose a continual odour I should not like to sniff for long.

THE NEW TRENT BRIDGE.

On Tuesday morning last the Bridge Committee met at the public offices to receive the tenders, and to determine upon the contracts for the new bridge over the Trent. Tenders were required to be delivered before ten o'clock in the morning, and forty-two by that time were received. The range in the estimates was very considerable, as will be seen from the following list; and many of the first firms in the country were competitors. The works are divided into two contracts; No. 1 being for the general builders' brick and stone work; and No. 2 for the cast and wrought iron work. The names and amounts are as follow:—

No. 1 CONTRACT.

Dennett & Company, Nottingham	£21,650 0 0
Lapish & Knowles, Shipley, Leeds	20,100 0 0
Shaw, Head, & Company, London and Stockton	18,386 0 0
Worcester Engine Works Company, Worcester	18,343 10 0
London Engineering and Iron Ship Building Company, Poplar, E.	17,600 0 0
Hewitson & Dagleish, Lancaster	15,965 14 10
Henry Jackson, London	15,500 0 0
Benton & Woodiwiss, Derby and Glossop	14,837 0 0
E. V. Ponsonby, Sheffield	13,189 0 0
Charles Verity, Doncaster	12,672 0 0

No. 2 CONTRACT.

E. V. Ponsonby, Sheffield	14,914 0 0
Darlaston Bridge and Roofing Company	12,600 0 0
Cochrane, Grove, & Company, Dudley	11,687 0 0
Fairbairn Engineering Company, Manchester	11,500 0 0
Thames Ironworks Company, Blackwall	10,900 0 0
Worcester Engine Company	10,6-9 10 0
Close, Ayre, & Nicholson, York	10,431 0 0
London Engineering and Ship-building Company	10,200 0 0
Haywood, Derby	10,000 0 0
Leeds Railway Plant Company	9,845 0 0
Phillips & Company, London	9,800 0 0
Cliff & Company, Bradford	9,665 0 0
Butterley Company, Alfreton	9,575 0 0
Gunson & Company, Leicester	9,514 0 0
Handyside & Company, Derby	9,294 0 0
North Staffordshire Engineering Co.	9,113 0 0
S. Ratcliffe & Company, Doncaster	8,830 0 0
Benton & Woodiwiss, Derby and Glossop	8,519 11 11
Wm. Richards & Company, Leicester	8,467 0 0
Butler & Pitt, Leeds	8,456 11 0
Shaw, Head, & Company, London and Stockton	8,250 0 0
Horseley Company, Tipton	8,2-0 0 0
Eastwood, Swingler, & Company, Derby	7,197 0 0
Smedley & Company, Belper	7,072 8 0

Nos. 1 and 2 CONTRACTS TOGETHER.

Worcester Engine Company	28,952 0 0
E. V. Ponsonby, Sheffield	28,105 0 0
London Engineering Company	27,800 0 0
J. Phillips, Westminster	27,490 0 0
Thomas Rumble, London	27,425 0 0
Shaw, Head, & Company, London and Stockton	26,636 0 0
Benton & Woodiwiss, Derby and Glossop	23,356 0 0
Cliff & Company, Bradford	22,338 0 0

After consideration, the Bridge Committee unanimously accepted the tender of Messrs. Benton & Woodiwiss, of Derby and Glossop, for the stone, brick, and other work of Contract No. 1, amounting to 14,837*l.*; and the tender of

Messrs. Andrew Handyside & Co., of Derby, for the ironwork of Contract No. 2, amounting to 9,294*l.*—the total sum being 24,131*l.* The estimates of Mr. Tarbotton, the engineer of the bridge, delivered to the committee for the corresponding works, were as follow:—Contract No. 1, 15,000*l.*; Contract No. 2, 9,500*l.*: total, 24,500*l.*

It will be seen by referring to the list, that the lowest tenders for the two contracts, added together, amounted to 19,744*l.*, and the highest tenders, so added, amounted to 36,564*l.*

RAILWAY MATTERS.

The inhabitants of Plaistow are displeased with the want of early and late trains by the Tilbury and Southend Railway, and have sent a memorial to the directors on the subject. It is urged that if greater facilities were afforded for reaching the City and returning from it, the vicinity would become more populous, and the railway profits be increased.

A farmer has got a verdict against the Lancashire and Yorkshire Railway Company for 134*l.*, damages for the destruction of a straw-stack by firing from sparks, or rather a live coal, from the funnel of one of their locomotives.

Mr. G. Remington proposes the construction of a railway from the South-Eastern Railway at Appledore to the town of Lydd, a descending gradient of 1 to 70 for 3½ miles to Dungeness, where the level of the railway-tunnel intended to pass under the English Channel would be 240 ft. below the level of low-water spring tides; from the latter level the line was to rise at the rate of 1 in 3,795 for about 7 miles, then a descending gradient at the rate of 1 in 1,200 for about 8 miles to the centre shaft, and thence another descending gradient of 1 in 3,265 for 11 miles to Cape Grisnez; from this point rising gradients of 1 in 70 and 1 in 81 to join the French railways. The height of the tunnel would be 30 ft. from the soffit of the arch to the centre of the invert, leaving a clear headway of 20 ft. for the trains. The space between the rails and the invert would be occupied by a spacious sewer, running along the central line of the tunnel, and on each side of it two air-tunnels for the purpose of providing ventilation. The width of the tunnel was to be 25 ft. It was proposed to carry the tunnel through the Wealdon formation, consisting of very strong clay, beds of freestone, and fresh-water limestone all the way. The estimated cost of the works, allowing 638,000*l.* for contingencies, was 7,000,000*l.* The probable income of the railway was estimated by Mr. Remington at 1,625,900*l.* per annum, the working at 650,360*l.*, and the net profit at 975,540*l.*

FREE LABOUR REGISTRATION SOCIETY.

The Committee of the Free Labour Registration Society have presented their first report. They say that during six months they have provided permanent employment for upwards of 1,000 workmen in various trades, "thus showing an average of more than 150,000*l.* a year, as the wages obtained for members." Bearing in mind the industrial depression under which the country has been and still is suffering, the committee think that this fact will be received with satisfaction. The society and the principles it advocates are, it is stated, making steady progress in the confidence of all classes of operatives. The names, ages, addresses, and references as to character and ability of upwards of 14,000 non-union workmen have been up to the present time registered in the books of the society. Complaint is made that while workmen have not been slow to avail themselves of the advantages held out by the society, employers of labour have not evinced an equal alacrity. "This," the committee say, "is no doubt partly to be accounted for by the depressed state of the labour market, but it is also in a great measure caused by the unwise practice, now too prevalent, of leaving all arrangements with the men to foremen and others, who are, in many cases, the unscrupulous adherents of trades unions. Conciliation and arbitration being the chief features of this society, it is sought to promote these objects by bringing masters and men more cordially and trustingly face to face." The benefit club is making, on the whole, satisfactory progress; and it is hoped that the time is not far distant when its operations will be very largely extended. The committee say they believe that one example of a sound society like theirs in full operation will ultimately be of greater use than the exposure of the false grounds of any number of other societies. To the report are appended several letters from employers, speaking in the highest terms of the society's operations, and praising the good character and efficiency of the men sent by them. A London master builder writes (and his letter is a specimen of many others):—"I can testify that your society is working an under-current of good which all employers are feeling the benefit of, though they may not openly acknowledge it, and I do hope they will respond to your appeal and support you liberally."

THE NEW LAW OF COMPENSATIONS.

In the New Regulation of Railways Act an alteration has been made as to the law of compensation for lands purchased or injuriously affected by railways, and which amendment, if adopted, will materially change the practice in "compensation cases." By the 41st section (31st and 32nd of Victoria, cap. 119), it is declared that, whenever, in the case of any lands purchased or taken otherwise than by agreement for the purpose of any public railway, any question of compensation in respect thereof, or any question of compensation in respect of lands injuriously affected by the execution of the works of any public railway, is, under the provision of the Lands Clauses Consolidation Act, 1845, to be settled by the verdict of a jury empanelled and summoned as in that Act mentioned; the company or the party entitled to the compensation may at any time before the issuing by the company to the sheriff as by that Act directed, apply to a judge of any one of the superior Courts of Common Law at Westminster, who shall, if he think fit, make an order for trial of the question in one of the superior courts upon such terms and in such manner as to him seem fit, and the question between the parties to be stated in an issue to be settled in case of difference by the judge, or as he directs; and such issue may be entered for trial and tried accordingly in the same manner as an issue joined in an ordinary action, at such place as the judge directs, and the proceedings to be under the control of the Court as an ordinary action. Furthermore, it is provided that whenever a company is called upon or liable under the Act mentioned to issue its warrant to the sheriff in the case of any disputed compensation, and the company obtains a judge's order, the obtaining of the same and notice thereof to the opposite party is to be a satisfaction of the company's duty in respect of the issue of the warrant. The verdict of the jury and the judgment of the Court upon the issue, as regards costs, &c., to be entitled to the same effect as if the verdict had been obtained before the sheriff on a warrant issued by the company under the recited Act. The provisions as to compensation cases have immediate operation.

A "MIDDLE ROW" IN THE CITY.

Sir,—It took thirty years of agitation to abolish "Middle-row;" but they are erecting another in the City at the present time!

Walking down Cheapside the other day, I beheld another Middle-row in process of formation. Would you allow me, in the *Builder*, to put on record a protest against such a monstrous absurdity. It seems almost incredible that such an idea as leaving twenty or thirty houses between Cheapside, Bucklersbury, the Poultry, and the Mansion House could be seriously entertained; but let everybody go and be convinced of the fact.

Another City matter. Can any individual give a reason why the south side of Newgate-street was not widened instead of the north side? (The improvements at Christ's Hospital, I suppose, did begin it.) Suppose this to have been done, and the ground that lay waste at the west end of Cheapside (it used to be said for the purpose of making an opening into St. Paul's Churchyard from St. Martin's-le-Grand), not built on, then have set the houses back from the Post-office to the first or second lane in Cheapside, and we should have had it and Newgate-street one thoroughfare, with a very slight deviation.

Only a Tailor.

A CHALLENGE TO BUILDERS OF CONCRETE HOUSES.

Sir,—I have long taken deep interest in the question of concrete for building, and have been at some considerable trouble to arrive at a fair decision as to its merits. Of the capability of the material I have no doubt: my hesitation rests solely on the economy of construction. Now, to adopt Mr. Tall's motto, "An ounce of fact is worth a ton of theory," I beg through you to place this practical test for those who have faith in the patentee's assertion, that concrete "is only half the cost of brickwork." I require four ordinary six-roomed houses erected. I will find all the materials on the ground at the price named in Mr. Tall's pamphlet, and will agree to pay for the work performed at the highest price he names, viz., 2*s.* 6*d.* per yard; further, I will undertake to pay 40 per cent. of the cost of the apparatus for one house, which is estimated at 75*l.*

The party who undertakes the work may or may not contract for the carpentry, as he may prefer.

Should any doubt arise as to the work being properly done, I shall be happy to abide by your decision, for which, of course, I should be pleased to pay.

G. C. J.

THE VENUS DE MEDICIS AND "LA BELLE TAILLE RONDE."

All the dimensions of the healthy adult torso of the human body are greater from side to side than from front to back; therefore the epithets "*belle*" and "*ronde*" in the above-quoted dictum, as applied to the "*taille*," waist, are utterly inadmissible. The smallest diameter of the waist, or that from front to back, of the Venus de Medicis is 7¼ in.; and the larger diameter is 9¾ in.

If now an oval be struck, having for its larger diameter 9¾ in., and for its smaller 7¼ in., the periphery or circumference of this oval will measure 27 in.; that is, for all practical purposes, three-sevenths of 5 ft. 2 in., the height of the Venus de Medicis in the perfectly erect position. If, therefore, any lady, knowing her height, would take the trouble to divide it into seven equal parts, three of those parts ought to be, according to that universally acknowledged standard of beauty, the exact circumference of her waist or the naturally smallest part of the torso. It may also be confidently asserted, as in the case of the shoe (see *Builder*, August 15th, "Apropos des Bottes"), that anything less than three-sevenths of her height for the circumference of the dress of that part of the body, will not only be out of proportion, but will occasion discomfort and inconvenience, and if *much* less will produce considerable pain and ultimate irremediable deformity not without its concomitant evils, which are fully described, by competent authorities, under the word "Corset," in the *Penny Cyclopædia*.

Joseph Bonomi.

"PARVISE."

Touching the discussion at Cirencester the other day, on the meaning of this term and the use of the building erected on the south side of Cirencester Church,* Mr. Thomas Wright, M.A., writes:—

"On my return I looked up that question of the parvis. *Parvisus*, the word in Mediæval Latin, is a mere corruption of the Greek word for paradise. It is explained by the Greek lexicographer, Hesychius, as the place in the locality for walking about. It was the place before the Greek temples where the philosophers walked and discoursed. It appears that in the early Greek churches it was usually planted with trees, and hence it gained the name of paradise. In Mediæval times all sorts of business was transacted in the parvis. The scholars in the university of Paris sometimes held disputations there, and it was the common place for the consul ation of lawyers. I can easily understand how in Cirencester it has been the place of meeting of the municipality to discuss the affairs of the town; and that that worthy lady, Alice Avening, might have thought it a public service to erect a building on the spot to keep the municipal authorities out of the rain. The only difficulty I have with it is, that there appears to be no authority for calling it a parvis (pronounced of course, rightly, parvee, but in English it was probably called parvis). But in the registers read by Mr. Black, which must of course have given the name as known at that time (since which we must suppose such a corruption of parvis must have taken place), it is called the 'vice,' and, as vice meant a newel or winding staircase, it was the word for it. It may be that the name may have arisen from such a staircase having been the original access to the room in which we met and talked,—nothing to do with parloir."

* See p. 597, *ante*.

SANITARY STATE OF STAFFORD.

We have received from those on whom we can rely statements as to evil and dangerous conditions existing at Stafford, which call for the immediate attention of the authorities. Amongst other things, the drainage is very defective.

Dr. Day, writing on the same subject in a local paper, says,—

"To my mind it is plain that if a balance were struck between the amount that would be required for the drainage of Stafford, and the saving that would be effected by such drainage, in *human life, human sickness, sorrow, and suffering*,—nor forgetting the before-mentioned '*poor rates*'—a comparatively limited period would be sufficient to clear off any debt it might be found necessary, in the first instance, to incur. I know that there are some persons in the town who comfort themselves with the belief that because the general death-rate of Stafford is a fraction or so below the average death-rate of all England (this being about 23 in the 1,000 per annum), therefore the health of the borough *must* be good; but surely they do not know, or, if they do know, they ignore, the circumstance of the Registrar-General having expressed the opinion that *all* death-rates exceeding 16 or 17 in the 1,000 *arise from preventible causes*,—yet further, they should bear in mind that even if the town be healthy, *according to their idea*, there can be no good reason why it should not be rendered *more* healthy, if it be practicable to make it so."

CHURCH POLYCHROMY.

Sir,—Can your readers give me any information on Polychromy? Among the hills and vales of Cumberland and Westmoreland there is great room for improvement in church decoration, and very small means to pay for any such improvement; we cannot raise money for carvings, sculpture, &c., but anything that would be effective, church-like, durable, and easy of execution, as well as cheap, would do much for the bare walls of our churches, especially in chancels, and tend to render what are in appearance little better than barns now, something more like houses of prayer and praise. Your kind insertion of this will be a great favour to many down here.

R. C. H.

DAMP DRIVING THROUGH BRICK WALLS IN EXPOSED SITUATIONS.

Sir,—I have tried a remedy suggested some time ago in the *Builder*, of carefully covering the wall with mottled soap dissolved in water, and, in twenty-four hours after, laying on a coat of alum dissolved on the coating of soap, but I found that the bricks, which were red, obtained a very decided tinge of blue when they had received the first wash of the soap, which was in no way removed when the alum was applied. The unsightly appearance given to the building quite precludes our using this remedy. If any of your readers have in their experience found out anything else that will keep damp from driving into or through walls *already built*, and will inform the profession through your valuable paper, they will, I am sure, confer a great benefit to the public, and to

UTILITARIAN.

THE CIRENCESER AMPHITHEATRE.

Sir,—On looking at the Roman amphitheatre, at Cirencester again, I think the shortest diameter was *originally* 130 *ft., and not* 129 *ft., which it measures now.* I think the soil has slipped down the slope on both sides a little, and thus rendered the distance across somewhat less than it was when used as an amphitheatre.

This has not occurred with the longest diameter, because there was no bank at the extremities.

JOHN BRAVENDER.

THE GATESHEAD PLATFORM ACCIDENT.

The coroner for Chester Ward of the county of Durham, has held an adjoured inquest, at Gateshead, relative to the death of James Barnet, seventy years of age, formerly an agent, who died on the 11th of August from injuries received on the 11th of June by the fall of the gentleman's platform at the ceremony of laying the foundation-stone of the new Town-hall.

The Coroner, in opening the business, said that it had been proved that the platform did fall; that Mr. Barnet, who was upon it, received injury; and that he died in consequence. Their inquiry would have reference to the cause of the disaster. They would have to ascertain who drew the plans, who gave the instructions, and who built and who inspected the platform.

Mr. John Johnstone, the architect for the new Town-hall buildings at Gateshead, deposed that on the 3rd of June last he undertook to get two platforms erected for persons to view the ceremony of laying the foundation-stone at the request of the Town-hall Sub-committee, which consisted of the Mayor (Mr. R. S. Newall), Mr. Ald. Bigger, Mr. Ald. Johnson, Mr. Redmayne, and Mr. B. Frazer. After viewing the ground, the sites were arranged, and on Friday, the 5th of June, he called upon Mr. Bell (who had contracted with Mr. Bulman for the joiner work), and told him to prepare the timber and have it sent over to start work on Monday, the 8th. He saw John Mason (Mr. Bell's foreman), and made a sketch on a bench of a plan of how he wanted the platform erected, so as to guide him in selecting the different lengths. On Wednesday, 10th June, he (Mr. Johnstone) had occasion to go to Hexham to assist in the laying of a foundation-stone there; and before he went (on Tuesday evening) he gave particular instructions to Mr. Bell and his foreman (Mr. Mason) that the gentleman's platform was to be erected in strict accordance with the ladies' platform, adding that the former was to be an elongation of the latter. He also asked Mr. Burnup, clerk of the works, to see to matters generally whilst he was away. On Thursday morning, when he returned from Hexham, he was astonished to find it had been erected on a different plan from that which he had prescribed, and remonstrated with Mr. Mason on the subject, and the answer which he received was, that the sub-committee had been there on Wednesday, the 10th (the day that he, Mr. Johnstone, was away), and had given orders through Mr. Burnup, clerk of the works, to that effect. Mr. Burnup had given orders that the gentlemen's platform was to be erected on the plan of an inclined plane, instead of with steps. He told Mr. Mason that he was astonished at so great a change having been made in the plan, and that he could not then be responsible for the work; and further, that he might finish the platform according to the instructions which he had received from the sub-committee, and that he (Mr. Johnstone) could not take any further interest in it, or words to that effect. He considered that the mayor had some practical skill, and that the other gentlemen who acted with him had a knowledge of those matters. He did not examine the platform, and, having every confidence in the builders, allowed two of his own clerks and his stepson to go upon it during the ceremony. His own business caused him to be engaged in another part. He did not give any formal notice to the mayor of declining the responsibility; he did not consider it his duty to do so, as he had never received any notice of the change that was made in his plans either verbally or by letter. The pressure on the platform constructed on an incline plane would be forward, and the strut springing from the foot of the upright at the back would lose its service, unless there was one placed in the opposite direction, or the joists or uprights in the front of the platform, near the level part, were sufficiently strong. He saw no supports to resist the forward pressure under the open space near the foundation-stone. It would have been safer to have had a strut with a heel forward to counteract the pressure in that direction. The platform seemed to have given way at the open space, as the wall was displaced upon which it had abutted. On a graduated stepped platform the pressure was vertical, but on an incline plane platform is was forward; on the first, only two persons could move; on the last, the entire number of spectators might, by a surging motion, be pressed forward without the power of resistance. The gentlemen's platform was built to contain about 500 people.

The Coroner inquired how many persons were upon the platform when it fell, and Mr. Elliott, the chief constable, who said he was experienced in judging of numbers, replied 200. The point was disputed, others saying 300.

The witness being further examined, stated that he felt very indignant on finding that his plan had been altered, and that he had been interfered with, but did not express his annoyance or objection to the mayor on Thursday morning when he saw him on the ground. He had full confidence in the practical skill of the mayor and members of the sub-committee, and therefore did not complain to them or the town-clerk. He considered that there were six heads against his, and he must have been in error. Moreover it was (as the Coroner had remarked) a disagreeable thing for him to find fault with his employers. Had his plan not been entirely superseded he might have given notice to resign. In that particular case, which referred to the voluntary erection of a temporary platform, for which he was to have no remuneration, and with regard to which he had not received formal notice of alteration, he did not think it necessary to give formally notice of being relieved of his responsibility. He did not, on the other hand, receive any formal notice from the mayor that his plan had been altered. There was no bad feeling between himself and the mayor.

Mr. J. Mason, joiner, of Cambridge-street, Newcastle, and foreman to Mr. George Bell, builder, of the Gateshead Town Hall, said he had received instructions from Mr. Burnup, clerk of the works, to construct the gentlemen's platform on the afternoon of Wednesday, the 10th June. He was to make it on an easy slope from 2 ft. to 2 ft. 6 in., from back to front, and it was to be dealed or planked over instead of stepped. Nothing was said about struts or anything else. Mr. Johnstone gave them directions on Tuesday night, before he went to Hexham, that they were to erect the gentlemen's on the same principle as the ladies' platform, and drew them out a chalk plan to convey the idea. The gentlemen's platform was altered in plan to an incline instead of a gallery. The planks were placed across the joists, every other one being fastened with four 6-inch clipped nails; he preferred those which were wrought. He put the strut in at the back of his own accord, because he was afraid of the platform going in that direction. He considered the platform on an incline not so strong as the galleried one. The uprights in the front of the platform—where it fell—were 4 ft. apart; but the alternate ones were not let into the ground.

A Juryman: That accounts for the accident.

The Coroner: Why were they not let into the ground?

Witness: Because of the stones. The alterations caused me to be hurried. Had the platform been constructed on Mr. Johnstone's plan I should not have been so hurried, as the steps for the gallery were all cut.

Mr. William Burnup, clerk of the works, said he did not receive any instructions from Mr. Johnstone, the architect, about the erection of the platform, nor did he interfere in any way with the exception of making known the orders of the sub-committee at two o'clock on Wednesday afternoon.

Mr. George Bell, builder, Westgate-hill, Newcastle, was the sub-contractor under Mr. Bullman, for the erection of the Gateshead New Town-hall, and Mr. Mason was his foreman. He was employed by Mr. Johnstone to erect the platforms in the first instance. The only instructions that he received with reference to the gentlemen's platform were from Mr. Burnup, at half-past seven on Wednesday night. He told him that the sub-committee had been on the ground and had altered the plan of the gentlemen's platform altogether. He (witness) said "Very well, they know best what they want," and Mr. Burnup replied, "I do not know what Mr. Johnstone will say when he comes back," and witness said, "Never mind Mr. Johnstone, you carry the instructions of the sub-committee out." He said they had likewise given instructions to strengthen the ladies' platform, and he said, "Well, by all means do it." He believed he asked Mr. Mason if the borough engineer had looked at it, and he replied that he knew nothing of the borough engineer. The mayor had the character of being a scientific man, and he thought that he knew something about the matter. He thought, also, that the borough engineer would have inspected the work as the surveyor for the borough of Newcastle inspected the stands, &c., on the Town Moor.

The Coroner: If you had not considered some one would have inspected it you would have spoken about the matter?

Witness: Yes; I dare say to Mr. Johnstone. The timber used was good. I told Mr. Johnstone that they had altered his plan, and he said, "Who the devil did that?"

The Coroner: If a building you were building was altered in your absence by your employers, what plan would you adopt?

Witness: I should ask my employers why they altered it.

The Coroner: Would you have gone further?

Witness: That would depend on circumstances. Mr. Johnstone is a very good-tempered fellow, or he would have gone to his employers and said, "I cannot be reponsible." I should have done that. They (his employers) should have sent some notice to him about having altered his plans.

The Mayor explained that the borough surveyor (Mr Borrie) had nothing to do with the Town-hall buildings.

Witness then said he considered the step plan the safest, as the people were standing at ease in that case, whilst on an incline, with their toes downwards, they were pressing forward. The people could be more densely packed on an incline than on a stepped platform.

Mr. Robert Stirling Newall said he was mayor of Gateshead and one of the sub-committee appointed to make arrangements for the laying of the foundation-stone of the Gateshead New Town-hall. He suggested that the level of the platform should be lowered, and that planks should be placed on the slope. The suggestion was thought to be a good one.

The Coroner: By whom?

The Mayor: The members of the sub-committee, and it (the suggestion) was therefore adopted. No orders were given about uprights, rafters, or struts. The order was to leave out the wedges and to lay the planks on the rafters. The slope was to be 2 ft. 6 in. instead of 6 ft., as Mr. Johnstone's scheme would have carried out. Mr. Ald. Johnson said to the joiner, "Now, mind you make it strong enough; make it more than strong, and no one will find it out; but if you make it too weak, every one will have reason to complain." The man said he would attend to it They made some alterations by way of strengthening the ladies' platform, and so rendered it the committee's rather than Mr. Johnstone's.

The Coroner: Was the other platform which you altered the committee's rather than Mr. Johnstone's?

The Mayor: Yes; so far as the altering it from the steps to the incline plane was concerned. This was the committee's recommendation. According to engineer's calculations, 70 lb. pressure is allowed on a platform per square foot: the forward thrust is in proportion to the angle of the rise, and by lowering the platform to 2 ft. 6 in. from 6 ft., we lessened the thrust in exactly the same proportion.

Mr. Johnstone stated that the pressure was so great that the accident dislodged 15 tons of masonry.

The Coroner said that he need not go through the whole of the evidence, as much of it did not relate to the inquiry. There were many engineering points which would not bear at all upon their verdict. It became them now to ascertain by whose neglect or want of caution it fell. He thought that, to get rid of the responsibility on either part, there ought to have been some remark made by one of the members of the sub-committee to Mr. Johnstone that they had altered his plan. Mr. Johnstone's attention ought to have been called to that alteration. He (the coroner) thought that Mr. Johnstone, for his own sake,—finding that the platform had been altered,—should have made some allusion to it, and, if he thought fit, relieved himself of the responsibility. The construction of the platform, however, was allowed to go on without any person inspecting it. Every one had come to the conclusion that there was nothing to support the forward pressure, and that a strut should have been placed in the contrary direction to the one from the foot of the uprights at the back. They had heard all the evidence; and, as many of them were builders, they would thoroughly understand the nature of the work. The man's death was caused by the fall of the platform, and it was for them to say who was to blame.

The jurymen retired, and returned after an absence of one hour and three-quarters with the following verdict:—

"We find that James Barnet died on the 11th of August of pyæmia, caused by injury to his foot by the falling of the platform at Gateshead on the 11th of June last; that the falling of the platform was caused by the want of proper struts at the open part against the foundation-stone; that Mr. Johnstone, the architect, could not give up his responsibility without first naming the fact to the sub-committee when he was on the platform on Thursday; that the sub-committee were equally to blame for altering the plan in the absence of the architect, and their not seeing that the platform was properly inspected."

The Coroner remarked that no recommendation was made about platforms or such structures being inspected in future. Their verdict, however, implied a want of proper inspection.

CHURCH-BUILDING NEWS.

Berden (*Essex*).—The parish church here has been re-opened after restoration under the direction of the diocesan architect, Mr. Joseph Clarke. The chancel has been almost entirely rebuilt. A considerable quantity of the old stone carving has been preserved. The number of sittings has been largely increased. The whole work has been completed at a cost of nearly 1,900*l*.

Stockton Heath.—The new church here has been consecrated by the Bishop of Chester. The edifice is in the Geometrical style, from the designs of Mr. E. G. Paley, of Lancaster. It consists at present of a nave and south aisle, both 75 ft. long, and a north transept 16 ft. by 16 ft., with an organ chamber and vestry. The chancel is 32 ft. by 25 ft. The exterior of the walls is of Runcorn stone, the interior of white bricks, the roof and pewing of Baltic timber, the doors of oak. The edifice has eight stained windows, executed by various artists. The large east window, by Messrs. Clayton & Bell, is the gift of Mrs. G. Greenall, of Walton Hall, and illustrates the principal events in the history of our Lord's Passion. The two smaller chancel windows are the gift of Miss Forde, of Stockton Heath Parsonage, and represent the incidents which took place at Bethany, and on the morn-

ing of the Resurrection. These were executed by Clayton & Bell, as were also the windows in the north transept, and that at the east end of the aisle. The subject of the former is the Transfiguration, the gift of Mr. G. Greenall, M.P. The latter is a memorial window, erected by Mrs. Payne, of Bath. In the west are two windows in a different style and more glowing colours, that in the nave, by Messrs. Heaton & Butler, the gift of Messrs. Greenall & Whitley, of Wilderspool, representing the Adoration of the Magi, the Disputation in the Temple, and the Entry into Jerusalem, with a medallion of the incredulity of St. Thomas. The baptistry contains a memorial window, erected by the Rev. W. and Mrs. Hayes, in remembrance of an infant son. The subjects are, the Good Shepherd, the Passage through the Red Sea, the Presentation in the Temple, Christ blessing little Children, and His own Baptism by the Baptist in Jordan. These subjects have been rendered by Messrs. Gibbs & Co.

Frinton (*Essex*).—The parish church of St. Mary, which has been recently restored, has been re-opened for divine service. The building had from long neglect fallen into decay, and the roof was in danger of falling through, when funds were subscribed, and the church thoroughly restored, under the direction of the architect, Mr. Henry Stone, of London. The interior fittings, pulpit, reading-desk, and benches, are all entirely new, and of stained deal, most of them the gift of private individuals. Mr. Joseph Grimes, of Colchester, was the builder employed.

Maidstone.—The first instalment of the improvements so long contemplated in St. Philip's Church has been commenced. The alterations to be carried out at present consist of additional accommodation being furnished for 200 persons, the rebuilding of the chancel arch, the formation of another aisle, and fitting up the church with a complete warming and ventilating apparatus. The contract for the alterations has been taken by Mr. Vaughan. Mr. Stephens is the architect.

Eyam.—The chief corner-stone of the new north aisle, chancel aisle, and vestry of the parish church has been laid. The new aisle will be called the "Mompesson Memorial Aisle," in memory of the Rev. W. Mompesson, rector of Eyam, during the plague of 1666. The church was discovered to be, when touched, in a far worse condition than was at first supposed, and a large amount of funds will be required for its complete repair. The committee have entered into a contract to rebuild almost the whole of the north aisle of the church at a cost of about 1,300*l.*, but they were recommended by their architect, Mr. G. E. Street, of London, not to proceed with the other part, including the nave, south aisle, and some alterations to the tower, until additional funds had been provided. It is calculated that 1,200*l.* are yet required to do what is absolutely needed, for which sum a renewed appeal has just been issued by the committee. Messrs. Melland & Son, of Bamford, are the builders employed.

Matlock Bath.—The chief-stone of a new church has been laid at Scarthin. The church, owing to the nature of the site, is necessarily irregular in form: it consists mainly of a nave, with small hexagonal chancel; also a north transept and ministers' vestry, underneath which will be placed the hot-water apparatus. The style of architecture is Early English of the fifteenth century; the front to the road, which will be built of Yorkshire "parpoints" with Matlock stone dressings, and single lancet-headed windows on either side. The entrance, over which there is a bell turret, is approached by a flight of steps, protected by a slated porch. The interior will be fitted up with open benches, which, together with the roof timbers, will be stained and varnished. Hartley's diamond church glass will be used for the windows, but it is contemplated hereafter to fill in several with stained glass. The building is being erected from the designs of Mr. John A. Wyatt, of Manchester, who is the architect for the large Hydropathic Establishment now in progress at Matlock Bath. The contract for the entire works has been undertaken by Messrs. Walker, of Wirksworth. The church will have 150 seats (all free), and the entire cost, including internal decorations and purchase of land, will be about 1,300*l.*

Langton.—The mother church at Church Langton has been restored. At Tur Langton a new church has been built, and the old one pulled down, with the exception of a window and doorway, which are left up as memorials of the old church. The church at Thorpe Langton has now been restored, or, at least, is under restoration, though it has been re-opened for divine service. The church consists of a tower and spire, a nave of three bays, and has a north and south aisle, with one row of seats in each. The nave, from the tower to the east end of the chancel, is of one width and height, and there is no chancel-arch to break the view from the west to the east end. The wood screen between the nave and the chancel has been restored, but the boarding has been carried too high, and will be altered. The top panel will be filled with open tracery instead of the tracery being put upon boards. The top of the screen is embattled, with stencilled border, and in the panels there is tracery. There are oak stalls in the chancel, carved, and the floor is laid with Whetston's encaustic tiles. The east window is filled with stained glass. The window is divided into four parts. The first is the Adoration,—at the foot the words "Unto us a child is born;" the second is the Crucifixion,—the words "Woman, behold thy Son;" the third is the Ascension, and the words "I go to prepare a place for you;" the fourth is the Spirit of God descending in the form of a dove, and the words "This is my beloved Son." The window is a memorial one. The church and chancel have been newly roofed. The spandrels are filled with open cut tracery, and there are large bosses of flowers at the centre of the beams. The seats, of deal, varnished, are open. The pulpit is a Jacobin or twelfth-century pulpit, and has been restored by Mr. Loveday. The font has been restored by Mr. Stanyon. The walls have been cleared of their plaster, and the stonework re-pointed, as well as the arches. The porch has been removed from the south to the north side of the church, and here a new one has been erected. The exterior of the church has also been restored where necessary, and new coping put on. A dry stone wall has been built to the yard attached to the church. The architect for these restorations has been Mr. J. Goddard, of Leicester. The work has been carried out by the contractors, Mr. Stanyon, of Market Harborough, the stonework, and Mr. Loveday, of Kibworth, the woodwork.

Miscellanea.

New Theatre Royal, Croydon.—There is now almost completed, and will be opened forthwith at Croydon, a compact and comfortable theatre. It is built after the style of the Amphitheatre in Holborn.

The Liverpool and Birkenhead Dock Works.—The report of Mr. Lyster, the engineer to the Mersey Docks Board, has been issued. It appears that during the year ending June 24th, 1868, the expenditure upon new works under the Act of 1863, on the Liverpool side of the Mersey, has been 86,238*l.* 17*s.*; repairs and maintenance, 70,681*l.* 15*s.* The total expenditure was 168,858*l.* 18*s.* 1*d.* On the Birkenhead side of the river there has been expended on new works, under the Acts of 1858, 1860, and 1866, 68,904*l.* 7*s.* 10*d.*; on works for the improvement and preservation of the estate, 131,606*l.* 12*s.*; on repairs and maintenance, 19,725*l.* 13*s.* 2*d.*; total expenditure, 220,236*l.* 13*s.* The works include the new iron dock and warehouses on the Liverpool side, and on the Birkenhead side the new iron warehouses and canal dock, and the new observatory on Bidston-hill.

Telegraphic Progress.—A project is on foot in California to establish a telegraph line from thence to China and Japan.——A special report in connexion with the Electric Telegraphs Bill has just appeared. A summary shows there are 1,280 miles of line and 4,226 miles of wire under a term of agreement with railway companies of from one to five years; 3,988 miles of line and 20,308 of wire under a term of agreement of from six to ten years; 3,211½ miles of line and 13,397 of wire under a term of agreement of from eleven to twenty years; 340½ miles of line and 1,247 of wire under a term of agreement of from twenty-one to thirty years; and 4,650 miles of line and 1,556 of wire with a term of agreement of from thirty-one to ninety-nine years,—making a total of 13,470 miles of line and 54,744 of wire under various terms of agreement between the telegraph and railway companies, the average duration of these agreements being 26¾ years per mile of line, and 25½ years per mile of wire.

Byculla Church, India.—Mr. J. Scott, stained glass manufacturer, Carlisle, has just completed a stained glass window for the church of Byculla, in India. Its dimensions are 14 ft. by 9 ft., and it is divided into six lights, the whole of which are filled with grisaille work. Near the top of the centre light is a wreath surrounding the arms of Spencer Compton, in whose memory the window is to be placed in the church.

Joseph not a Carpenter.—When the British Archæological Association were inspecting the gallery of paintings at Charlton House, attention being called to the picture of Joseph working as a carpenter, assisted by the child Jesus, Mr. Black said he wished that Joseph had been represented in his proper business as a mason, the original term used signifying architect, builder, or mason, and not carpenter. The term carpenter, he urged, was undoubtedly an error, as in the climes where Joseph dwelt no wood was used in the erection of the structures of their houses, but stone only.

Fine Arts Exhibition at Norwich.—The first exhibition of the Norwich Fine Arts Association, established for promoting the arts of painting and sculpture, for reviving the Norwich school of landscape painting, and to provide a gallery of art for Norwich, has been opened in the Artists' Room, Exchange-street, a room that is by no means adapted for the display of so large a collection as is now within its walls; but unfortunately the committee had no choice, as every other room in the city was engaged for the British Association. The collection seems to include, amongst a number of very indifferent ones, a few good pictures.

South Staffordshire Industrial and Fine Arts Exhibition.—It has been determined to hold, during the spring and summer of 1869, at Wolverhampton, an industrial and fine arts exhibition, under the auspices of the committees and supporters of the Wolverhampton School of Practical Art, and of the South Staffordshire Educational Association. There has been no difficulty in finding guarantors. The minimum fund was fixed at 2,000*l.*, and the liability was limited to 10*l.* from each guarantor, the object being to produce a wider interest in the exhibition than by allowing any one to guarantee a larger sum. The proposed site for the exhibition is Molyneux House and grounds, in the Waterloo-road. The out-buildings could be made useful, and there is space for the erection of annexes.

The Improved Industrial Dwellings Company.—The tenth half-yearly meeting of the shareholders will be held at the Cannon-street terminus Hotel, this Friday, August 28th. In addition to the 50,000*l.* in 100*l.* shares already allotted, 43,250*l.* have been subscribed in 25*l.* shares, making the total subscribed capital 93,250*l.*, of which 4,900*l.* have come in since the date of the last report. The directors propose that the usual dividend, at the rate of 5 per cent. per annum, shall be declared payable out of this sum, which will amount to about 1,824*l.* 1*s.* 5*d.*, and that the balance of 526*l.* 16*s.* 9*d.* be carried forward.

The properties belonging to the company at present completed and occupied are as follow:—

Cobden Buildings, King's Cross-road	20	Tenements.
Nelson Buildings, Bridge-street, Greenwich	40	,,
Tower Buildings, Brewhouse-lane High-street, Wapping	60	,,
Stanley Buildings, Old St. Pancras-road, King's Cross	104	,,
Palmerston Buildings, City Garden-row, City-road	72	,,
Cromwell Buildings, Red Cross-street, Southwark	24	,,
Derby Buildings, Britannia-street and Wicklow-street, King's Cross-road	168	,,
Total	488	Tenements in occupation.
Buildings in course of erection at Willow-street, and at the Bethnal Green estate, to be completed this year	190	
	678	

The Ebury-street site will accommodate about 100 more families, so that the total number of tenements built and projected by the company at this date is about 778. These will afford decent, comfortable homes to about as many separate families, or to 3,890 persons, reckoning five to each family.*

* The Corporation of London have also erected 168 tenements in Farringdon-road; and the Highgate Improved Industrial Dwellings Company have built sixty tenements at Highgate. These, added to the original 105 at Langbourne Buildings, built by Sir Sydney Waterlow, make up the total number of dwellings built and projected upon the plan adopted by the company to 831, with accommodation for say 4,100 persons.

Birmingham Architectural Society.—This society having determined upon an annual visit to some place of interest to the profession, on Tuesday, the 18th, made their first excursion to Oxford. Several architects and gentlemen of that city joined the party, and added to the pleasure of the day by description of the following buildings visited:—Christ Church, chapter-house, cathedral, hall, &c.; Magdalen College, All Souls College, New College, and Merton College; the Bodleian Library, University Museum, and Exeter and Baliol College chapels. The party then adjourned to the Randolph Hotel, where they dined.

Taylor's Bridge Competition: Camberwell. Mr. T. W. Smith wishes us to say that the letter he wrote on the subject of his estimate was addressed to the vestry, through the vestry clerk, and not to the chairman, as stated; and that he "put the address at the top mechanically, as it were, and without for one moment supposing that my name could be discovered by searching in the original applications for particulars; and I do not see what advantage it could be even were my name known, for until the decision was made known, I was utterly unacquainted with even the names of the vestrymen." We willingly give his explanation, but the fact remains.

Fall of Part of a House in Golden-square. On Tuesday morning consternation was caused in Marshall-street, Golden-square, by the fall of the greater part of a house there. Several houses in the above-named street have recently been pulled down by Messrs. Patrick, contractors, for the purpose of erecting some warehouses for Messrs. Metzler, and about the time stated the party-wall of the house, No. 23, which had adjoined those pulled down, fell with a heavy crash, leaving the interiors of the whole of the rooms, and the inmates, some of whom were in bed, exposed. Fortunately the occupants of the different rooms sustained no bodily injury.

Corn Exchange, Wareham.—At a recent meeting of the corporation of the borough, a requisition was read from sixty-one farmers, corn-factors, millers, and dealers, attending the Wareham markets, drawing attention to the necessity for a corn-exchange. It was resolved, unanimously, that the town-clerk write to the requisitionists saying that the corporation will be happy to facilitate the providing a corn-exchange, and that they are making further inquiry as to their power to dispose of some property for the purpose. The site which was suggested as most desirable was that of some premises, half-way up West-street, called "Chaffin's Living."

Presentation to a Manager of Works.—On Saturday, the 22nd, a watch and chain and a purse containing ten guineas were presented to Mr. Clabrough, manager of the Bristol City Hotel Works, by the men under him, as a mark of esteem. A dinner was held at the St. John's Porter-house, Stonebridge, at which a large number of the men attended. Mr. Ponsford, who presided, in proposing the health of Mr. Clabrough, expressed his pleasure that the feeling of antagonism which at one time existed between employers and employed was dying out, and that a new state of things was fast coming into existence. At one time questions of mutual benefit could not be discussed by them with comfort or satisfaction, but now it was felt that differences might easily be adjusted by mutual arrangement. With regard to their esteemed manager, he was sure that there was but one feeling throughout the whole of the works. Mr. J. Bool then made the presentation on behalf of the workmen, and said that such conduct as had characterised Mr. Clabrough's dealings with workmen in this city would do much to promote a better state of feeling than that which at present existed between employers and employed. Mr. Clabrough, in returning thanks, said that when he and his employers, Messrs. Warburton, came there they were supposed by many to be antagonistic to all tradesmen and all trade laws—they were supposed, in fact, to be foreigners. Complaints had been made that "stuff" had been used in the building on which they were employed that had been brought from other places; but the fact was they got it all from there. In Bristol there were firms that advertised in the *Builder* and other papers offering to supply joiners' work all the world over. If Bristol could not compete with other towns why should not other towns supply them? But it was well known that Bristol could compete if it would.

Oundle Church on Fire.—On the morning of Sunday a fire broke out in the tower and spire of the parish church of Oundle, Northampton. The peal of bells (the finest in the whole county) suffered much, the first, second, third, and tenor being cracked; one of them, through the heat, being literally broken in two. The fire is attributed to spontaneous combustion, originating in a platform filled with sawdust, which when the church was restored was placed there to deaden the sound of the bells on the ringers. The whole framework of the belfry was in a blaze; the falling of the clock-weight on the third bell caused the beam to snap and the bell to break.

Fires.—A paraffine oil and wax factory has been burnt down in the Wick-road, Hackney-wick. The men had imprudently used a naked lighted candle, which set fire to the vapour from the oil. The building was destroyed, and adjoining premises were damaged.——A large sugar refinery at Greenock has been burnt. The damage is estimated at 30,000*l*. The refinery was only erected about five years ago.——Shepheard's hotel, at Cairo, has been destroyed by fire. The alarm was given by an explosion in a store closet containing paraffine or "gaz" candles and other combustibles. Keamil Pasha's house and the new hotel, which has cost 120,000*l*., and is not yet completed, ran great risk from the fire. Although fires are rare in Cairo, there had been one on each of the nine preceding days.

The Hereford Workhouse Improvements.—At a recent meeting of the local Board of guardians, Mr. T. Davies endeavoured to obtain the authority of the Board to the front centre of the workhouse being raised, so as to be in accordance with the new wings, at an outlay not exceeding 200*l*.; and accordingly moved that the architect, Mr. Chick, be instructed to prepare plans, and to take steps to obtain the sanction of the Poor-Law Board to the same, so that the alteration may be made in the spring. Mr. Parry moved as an amendment, "That the consideration of the whole subject be deferred till the ensuing spring;" and Mr. Apperley another amendment,—"That the original proposition be rejected entirely;" and this last motion was agreed to by a majority of 17 to 11 for Mr. Parry's amendment, and two for the original motion.

TENDERS.

For a 75-quarter malting and stores, at Royston Railway Station, for Messrs. Phillips, Brothers. Messrs. Nash & Son, architects:—

Gibbon	£3,950 0 0
Whittaker	3,950 0 0
Gunson (accepted)	3,048 0 0

For pulling down Upper Circus Lodge, Royal-hill, and building new house and shop, at Greenwich, for Mr. Edwin Shalless. Mr. Henry Roberts, architect. Quantities not supplied:—

	Including Old Materials.
Hoare & Postlethwaite	£950 0 0
Ware	865 0 0
Fenn (accepted)	660 0 0

For a new Baptist Chapel, Mill-street, Bedford. Mr. John Usher, architect. Quantities supplied:—

H. J. Dover & Co.*	£3,371 0 0
Wild & Smith*	3,040 0 0
Winn & Foster	2,961 0 0
Spencer	2,953 0 0
Haynes	2,801 13 0
Dickens	2,730 15 0
Canvin	2,593 0 0
Hull & Smith	2,565 0 0

* Old materials, about 250*l*., not deducted.

For house and conservatory, for Mr. W. H. Toomer, at Twyford. Mr. W. Allen Dixon, architect. Quantities supplied:—

Staines	£3,386 0 0
Laurance	3,174 0 0
Manley & Rogers	3,157 0 0
Mann	3,145 0 0
Eaton & Chapman (accepted)	3,050 0 0

For alterations and additions to premises, situated in Silver-street, Bedford, for Mr. H. Peacock. Mr. John Usher, architect:—

Haynes	£660 7 0
Harrison	583 0 0
Dickens	473 0 0

For alterations and additions to premises, Bury-street Aldgate:—

King & Sons	£1,015 0 0
Henshaw	942 0 0
Dawes	880 0 0
Ball & Russell	823 0 0
Stewart & Bennett	670 0 0

For alterations in the interior arrangements of the Warehousemen and Clerks' Schools, at Russell-hill, near Croydon. Mr. James L. Pedley, architect:—

Breeze & Emmett	£343 0 0
Ward (accepted)	287 0 0
Hearle	285 0 0

For new lodge to Congregational Church, Blackheath. Mr. J. E. Saunders, architect. Quantities supplied:—

Little	£578 0 0
Larke	576 0 0
Colls & Sons	575 0 0
Jerrard	564 0 0
Staines & Son	548 0 0
Perry	488 0 0

For new Baptist Chapel, Potter's Bar. Mr. W. Allen Dixon, architect:—

Garrud (accepted)	£717 0 0

For cemetery buildings, at Fulham, Middlesex, for the Hammersmith Burial Board. Mr. George Saunders, architect. Quantities by Mr. Shrubsole:—

Butt & Son	£2,899 0 0
Wilson	2,850 0 0
Chamberlain, Brothers	2,830 0 0
Messrs. Williams	2,760 0 0
Wigmore	2,749 10 0
Cowland	2,640 0 0
Palmer	2,460 0 0
Staines & Son	2,378 0 0
Nightingale	2,240 0 0
Crabb & Vaughan	2,184 0 0

For alterations to No. 148, Camberwell-road, and the erection of three cottages, for Mr. J. H. Machu. Mr. Farris, architect. Quantities supplied by Mr. Shrubsole:—

George	£945 0 0 !
Mann	840 0 0
Banham	825 0 0
Dunstan	811 0 0
Bottomley	799 0 0
Capron	798 0 0
Watkins	730 0 0
Redditch	728 0 0
Soden	720 0 0
Falkner	690 0 0
Blackmore & Morley	650 0 0
Foster	649 0 0
Gibbs & Son	575 0 0
West	575 0 0
Llewellyn	563 0 0
Pearce	560 0 0
Shirley	548 0 0
Baxter (accepted)	495 0 0 !

For alterations and additions to the Gibraltar Tavern, St. George's-road, Southwark:—

Nightingale	£963 0 0
Wills	853 0 0
Reed	724 0 0
Linfield & Son	714 0 0
Pitcher	675 0 0
Falkner	629 0 0
Watkins	595 0 0
Gammon & Sons	590 0 0
Chutter	569 0 0
Cubitt	495 0 0

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